FULTON COUNTY PURCHASING DEPARTMENT

Winner 2000 - 2004 Achievement of Excellence in Procurement Award
National Association of Purchasing Management

Jerome Noble, Director

FULTON COUNTY

September 15, 2005

RE: **05RFPPROVPRK-B, Providence Park Remediation Project-Phase I**

Dear Proposers:

Attached is one (1) copy of Addendum 2, hereby made a part of the above referenced Invitation to Bid (ITB).

Except as provided herein, all terms and condition in the ITB referenced above remain unchanged and in full force and effect.

Sincerely,

Charlie Crockett,
Assistant Purchasing Agent

This Addendum forms a part of the contract documents and **modifies** the original ITB documents as noted below:

- **Attached CSR Report**
- **EPD Comments on the CSR**
- **Maps**

ACKNOWLEDGEMENT OF ADDENDUM NO. 2

The undersigned proposer acknowledges receipt of this addendum by returning one (1) copy of this form with the proposal package to the Purchasing Department, Fulton County Public Safety Building, 130 Peachtree Street, Suite 1168, Atlanta, Georgia 30335 by the ITB due date and time **Tuesday, September 27, 2005 no later than 11:00 A.M.**

This is to acknowledge receipt of Addendum No. 2, _____ day of _____, 2005.

_____
Legal Name of Bidder

_____
Signature of Authorized Representative

_____
Title

CSR REPORT

It should be noted that it does not include the appendices (figures, tables, laboratory analysis sheets, etc.).

STATEMENT OF FINDINGS

The Compliance Status Investigation (CSI) detailed in this report was performed by KEMRON Environmental Services, Inc. (KEMRON) on behalf of the Fulton County Department of Parks & Recreation. The purpose of the CSI was to determine the source areas at the site, determine the horizontal and vertical extent of constituents of interest (COI) in soil, groundwater and surface water, and to determine the compliance status of the site with regard to Risk Reduction Standards (RRS). RRS are established under the Georgia Hazardous Site Response Act (HSRA).

The site is a park operated by the Fulton County Department of Parks & Recreation. The park is approximately 45 acres in total area. Numerous walking trails, a lodge building, a high ropes course, rock climbing wall, amphitheatre, and fishing lake are located within the park boundaries. A site is defined by HSRA to include all properties affected by a release of a reportable quantity of a regulated substance. The site in regards to this Compliance Status Report (CSR) consists of a portion of the Providence Park facility.

The CSI included field investigations conducted by KEMRON to determine source area soil and groundwater concentrations, an electro-magnetic (EM) survey to aid in determining source areas not readily visible or beneath the surface, additional delineation activities, surface water and sediment sampling, structural analysis and a receptor survey.

The source of the release(s) at the site is the dumping of drums and other containers. While the exact contents of the drums and containers is unknown, it is believed that solvents, paints, epoxies, petroleum products, herbicides and pesticides were disposed of at the facility at some point in the past. The dumping of auto parts and other "household" type garbage is also believed to have contributed to the impact to soil and groundwater. Based on the review of aerial photographs and other historical information, it is believed that the dumping occurred sometime between the late 1950's and 1970. The site was formerly operated as a road aggregate quarry and county maintenance facility until approximately 1970. The property was subsequently developed by Fulton County as a park reportedly in 1971.

Concentrations of RCRA Metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, herbicides, and poly-chlorinated biphynels (PCBs) were detected in soil and/or groundwater at the site. The horizontal and vertical extents of the COI in soil and groundwater have been adequately defined at the site. Complete delineation was ultimately limited by physical restraints such as very steep and almost vertical slopes, an open quarry pit and Providence Lake. Details pertaining to delineation activities will be discussed subsequently in this report.

Type 2 RRSs for soil and groundwater were developed for the site. The site was evaluated for compliance with the RRSs and was found to not be in compliance with any Type RRSs.

CERTIFICATION OF COMPLIANCE WITH RISK REDUCTION STANDARDS

I certify under penalty of law that this report and all attachments were prepared under my direction in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Based on my review of the findings of this report with respect to the risk reduction standards of the Rules for Hazardous Site Response, Rule 391-3-19-.07, I have determined that the following property (identified by Fulton County, Georgia, Tax Parcel ID Number) is not in compliance with any Type Risk Reduction Standards:

Parcel 22-4780-0963-001-5

Certified By: Date:

_____ _____

Ms. Karen Handel, Chairman
Fulton County Board of Commissioners

GROUNDWATER SCIENTIST STATEMENT

I certify that I am a qualified groundwater scientist who has received a baccalaureate or post-graduate degree in the natural sciences or engineering, and have sufficient training and experience in groundwater hydrology and related fields, as demonstrated by state registration and completion of accredited university courses, that enable me to make sound professional judgments regarding groundwater monitoring and contaminant fate and transport. I further certify that this report (Compliance Status Report, dated October 29, 2004, completed for the Fulton County Department of Parks & Recreation) was prepared by myself and appropriate qualified subordinates working under my direction.

_____

Robert M. York, P.G.
Technical Services Manager
KEMRON Environmental Services, Inc.
Professional Geologist
Certification Number 001454

_____

Date

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List of Figures, Tables and Appendices

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SECTION 1
INTRODUCTION

The Fulton County Department of Parks & Recreation retained KEMRON to conduct a CSI of the Providence Park site and develop a CSR. The site is located in North Fulton County, approximately 2.5miles to north of downtown area of the City of Alpharetta. A Topographic Location Map has been included as Figure 1. The subject site was placed on the Georgia HSI following the discovery of numerous abandoned 55 gallon drums and other debris that had been dumped in the park in the past. Concentrations of lead and other metals exceeding the HSRA Notification Concentrations (NCs) were detected in soil samples collected by ATC Associates, Inc. (ATC). The CSI was conducted in a manner to meet the requirements of the Georgia HSRA regulations and included the following tasks:

- Identification of Potential Source Areas
- Delineation of the Horizontal and Vertical Extent of COI in Soil and Groundwater
- Receptor Survey
- Surface Water Sampling
- Sediment Sampling
- Structural Analysis
- Development of RRSs
- Determination of Compliance Status
- Ecological Risk Assessment

SECTION 2
SITE BACKGROUND

2.1 SITE DESCRIPTION

The site, known as Providence Park, is a unit of the Fulton County Department of Parks & Recreation. The site consists of approximately 45 acres and is located in North Fulton County, approximately 2.5 miles north of the City of Alpharetta. The park entrance is located off Providence Road, approximately 1.25 miles to north of the intersection with Mayfield Road. The property has been utilized as a park since 1971. Prior to 1971, the property was utilized as a Fulton County road aggregate quarry and maintenance facility. The park consists of one main lodge building, a rock climbing course, a high rope course, a network of walking trails, a small amphitheatre, and a fishing lake (Lake Providence). The lake was reportedly constructed around 1970 as a watershed. An open quarry remains at the park and is utilized as the rock climbing area. An area along the extreme southeastern portion of the lake also appears to have been formerly used a quarry based on aerial photographs obtained by KEMRON. A small stream originates in the bottom of the open quarry, and subsequently intersects a second stream which ultimately forms the lake. The streams form the eastern boundary of the park. The two small tributaries combine to form Sandy Creek. The lake forms the northern boundary of the park. The park is bounded to the south and west by privately owned land that is primarily wooded with scattered residences. Figure 2 is an Area Map showing the park boundaries, entrance and other pertinent features.

KEMRON was retained by Fulton County in January 2004 to conduct the removal of up to a reported quantity of sixteen gallon drums that had been discovered at the park. The drums were discovered at the surface in several areas along the northern area of the park, roughly between the main lodge building and the lake. The majority of the drums were empty or partially filled with soil, leaves and other debris. A solidified substance, believed to be paint and/or some type of epoxy, was discovered in a relatively small number of the drums. Samples collected by KEMRON of the contents of the drums revealed the substances to be non-hazardous based on the results of a TCLP analysis. During the course of this removal action, additional drums were discovered and subsequently removed. The drums were found to be concentrated in three main locations. These locations are shown on the Site Map included as Figure 3. Single drums and scattered debris were noted in other locations. Among the debris were numerous gasoline containers, small paint cans, and general household debris. Automotive parts were observed at several locations as well. However, the area of visible drums and/or debris is isolated to the areas shown on Figure 3, and extending northward to the lake bank and northeastward to the headwaters and marshy area of the lake. Areas of discolored soil and solidified paint/epoxy were also noted in isolated locations in these same areas. A localized area of what appears to be roofing material is also visible protruding from the lake bank immediately to the west of the observation deck shown on Figure 3.

Based on review of aerial photographs obtained by KEMRON, it appears that the area where the majority of the surficial drums were discovered was formerly quarried. It is presumed this activity was carried out until at least 1966 based on the photograph of that date. The aerial photograph dated 1971, shows the area appears to have been filled and limited vegetation is

starting to appear over the area. Copies of the photographs have been included as Appendix I. Evidence of the filling activity can be observed today as evidenced by the hummocky nature of the topography in this area. Details pertaining to the depth to rock and amount of fill in this area will be discussed subsequently in this report.

2.2 PREVIOUS INESTIGATIONS

ATC conducted limited soil sampling at the site in November 2003. Concentrations of lead, barium and chromium were detected in soil samples at levels exceeding the respective HSRA Notification Concentration (NC). Details pertaining to this sampling are limited. A copy of the available portions of the ATC report has been included as Appendix II.

2.3 SITE SPECIFIC CONSTITUENTS OF CONCERN

VOCs:	SVOCs:	RCRA Metals
Benzene	Caprolactam	Arsenic
Toluene	2-Methylnapthalene	Barium
Ethylbenzene	Bis (2-ethylhexyl) Phthalate	Cadmium
Xylenes	Butyl Benzyl Phthalate	Chromium
4-Methyl-2-Pentanone	Di-n-butyl Phthalate	Lead
2-Butanone	Naphthalene	Mercury
Acetone	2,4-Dimethylphenol	Selenium
Cyclohexane	2-Methylphenol	
Methylcyclohexane	4-Methylphenol	
Isopropylbenzene	Acetophenone	
Carbon Disulfide	Styrene	
Cis-1,2-dichloroethane	Phenanthrene	
Tetrachloroethene	Pyrene	
Trichloroethene	Dimethyl phthalate	
Vinyl Chloride		
1,1,1-Trichloroethane		
1,2,4 Trimethlybenzene		
1,3,5 Trimethylbenzene		
n-Propylbenzene		
n-Butylbenzene		
Chloromethane		

Pesticides:	Herbicides:	PCBs:
Delta-BHC	2,4-DB	Aroclor 1248
gamma-chlordane	2,4,5 TP Silvex	Aroclor 1260
alpha-chlordane	Pentachlorophenol	Aroclor 1242
4,4-DDE	Dichloroprop	
4,4-DDD		
4,4-DDT		
Beta-BHC		
Heptachlor		

2.4 POTENTIAL SOURCES

The source of the COI outlined above detected in soil and groundwater at the site is the dumping of 55 gallon drums, smaller containers and other debris. It is believed that the dumping occurred roughly from the 1950's to approximately 1970 when the property was being converted to the current utilization as a park. The source of the materials is unknown. Given the wide range of compounds detected at the site, coupled with the observed drums, household refuse, automobile parts and smaller containers at the site, it is likely that the materials disposed of at the property originated from multiple locations.

Numerous RCRA Metals were detected above their respective HSRA NC in soil. The source of the metals detected at the site is believed to be paint. What is believed to be solidified paint was observed in at least one of the drums. In addition, areas of discolored soil also appear to have been impacted by paint. It is possible that the dumping of automotive parts and debris may have contributed to the metals impact at the site.

The source of the VOCs at the site can be attributed to solvents and petroleum products, and possibly automotive parts. Tetrachloroethene (PCE) was detected in groundwater samples in one monitoring well. Trichloroethene (TCE), cis-1,2-dichloroethane (DCA) and vinyl chloride (VC) were also detected at this well location. The TCE, DCA and VC concentrations are likely the result of the reductive dechlorination of the PCE. The benzene, toluene, ethylbenzene and xylenes (BTEX) concentrations detected are most likely the result of solvents and petroleum products. Given the slight concentrations of benzene detected relative to the concentrations of toluene and xylenes, the concentrations detected are most likely the result of solvents.

The source of the SVOCs detected at the site are most likely related to tars/creosote (phenols), plastics (phthalates and caprolactum), and petroleum products (naphthalene, pyrene, etc). The tar is likely related to the dumping of the roofing material and epoxies. The phthalates and other plasticizer compounds are likely the result of the decomposition and/or burning of plastics at the site. Roofing materials can be observed protruding from the steep slope along the edge of the lake immediately to the west of the observation deck.

2.5 USE OF PROPERTY AND SURROUNDING PROPERTY

The subject site has been utilized as part of the Fulton County Department of Parks & Recreation since 1971. The most common utilization of the property consists of nearby residents using the walking trails at the site. Walking trails in the area of the investigation are shown on Figure 3. Summer camps and other youth activities at the property utilize the rock climbing facility and high ropes courses. The rock climbing facility is located in the quarry pit, which is to the south of the area of investigation. The quarry pit is shown on Figure 3. The high ropes course is located well to the south of the area of investigation along the park entrance road. The lodge building is located immediately to the south of the area of investigation and is shown on Figure 3. A portion of Lake Providence is also maintained as part of the subject facility. Private property owners own the lakefront on the north side of the lake, as well as a substantial portion on the southwestern side as well. A fishing dock is located on the park property, well to the west of the area of investigation. The lake is reportedly utilized for fishing and canoeing activities by local property owners and park visitors. An amphitheatre is also located on the park property well to the south-southeast of the area of investigation.

Surrounding properties consist primarily of wooded acreage with scattered residences. A subdivision is located to the east of the park. A cellular tower is currently being erected immediately adjacent to the park entrance on the property to the south.

SECTION 3
SCOPE OF CSI AND ENVIRONMENTAL SETTING

3.1 GENERAL SCOPE OF CSI

The CSI fieldwork was completed by KEMRON from March through October of 2004. The primary objective of the investigation was to determine the COI and worst case concentrations, identify potential source areas, determine the horizontal and vertical extent of the impact to soil and groundwater, collect surface water and sediment samples, and conduct a receptor survey.

The field investigation consisted of the collection of eleven shallow hand auger samples collected from visible drum areas, the collection of soil samples from direct push technology (DPT) borings and monitoring well locations, the collection of two sediment samples, the collection of seven surface water samples and the installation of twenty permanent monitoring wells. Upon completion of the field investigation, a site survey was completed by Barton Land Surveying, Inc. (Barton). The top of casing (TOC) elevations of each of the monitoring wells were also surveyed by Barton.

3.2 REGIONAL GEOLOGY AND HYDROGEOLOGY

The site is located in the Piedmont Geophysical Province of North Georgia. The Piedmont is an extensive area originating in Northeastern Alabama and terminating in Maine. The Piedmont is characterized by bedrock consisting of high grade metamorphic rocks with varying amounts of igneous intrusion. The predominant rock types are schist, gneiss, amphibolite and varying amounts of granitic rocks. The rocks in the Piedmont have typically been subjected to extreme heat and pressure with extensive faulting and folding. Bedrock in the Piedmont is typically overlain by varying thicknesses of residuum that is formed by the in place chemical weathering of the parent rock. The thickness of this residuum varies. The term saprolite is often applied to the soils in the Piedmont which exhibit the relict structures (i.e. banding, etc.) of the parent rock. Rock outcrops across the subject site, and is extensively exposed in the open quarry located on the property. The quarry was formerly utilized to provide road aggregate. Aggregate is typically comprised of hard silica rich rock. The rock type at the subject site can be described as quartz feldspar muscovite biotite gneiss. The amount of residuum at the site varies greatly, and has been altered due to the former quarrying operation, cutting and filling. The depth to rock at the site varied from 5 ft to over 20 ft below grade based on the installation of the twenty monitoring wells at the site. It is believed that the variability in depth to bedrock is due to the former use of the property as a quarry.

Groundwater in the Piedmont regions generally occupies pore spaces in the residuum and joints, fractures and other secondary openings in the bedrock. Primary porosity in the bedrock is virtually nonexistent. The groundwater in the bedrock is typically stored along planes of foliation, joints, stress relief fractures and other openings. Groundwater was encountered in the residuum at the site, as well as in the bedrock. The depth to groundwater, as well as the determining factor in whether groundwater was encountered in the residuum, appears to be the relative elevation at the site. The topographically lower monitoring well locations (those in closest proximity to the lake and/or stream) yielded groundwater in the residuum.

Groundwater flow in the Piedmont typically correlates with the surface topography in the shallow groundwater in the residuum overlying the rock. Recharge typically occurs in interstream areas, and discharge typically empties into streams, lakes and swamps. Groundwater flow in the fractured bedrock is typically controlled by the orientation of the fractures.

3.3 SITE GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

Soil samples were collected from soil borings using hand augers and DPT technology, and from hollow stem auger techniques utilizing split spoon samplers. Boring logs have been included as Appendix III. Soil descriptions from the samples collected by ATC have not been made available to Fulton County or KEMRON.

Three cross sections were developed utilizing the soil descriptions noted during the CSI, coupled with depths to rock and groundwater. Figure 4 is a Cross Section Prime Lines Map. Cross Section A-A' is oriented perpendicular to groundwater flow and Cross Section B-B' is oriented parallel to groundwater flow. Cross Section A-A' has been included as Figure 5 and Cross Section B-B' as Figure 6.

Soil underlying the site has been described primarily as Sandy Silts and Clays. Saprolitic conditions were encountered across the site ranging in depth from 5 to over 20 ft below grade. Depths to bedrock ranged from 5 ft below grade at the monitoring well MW-8 location to over 20 ft below grade at several monitoring well locations. The depth to rock tended to decrease southward across the site, as the relative topographic elevation increased. This is supported by the location of the existing quarry pit where bedrock is exposed at or near the surface. Bedrock was also observed at the floor of the stream which forms the eastern and northeastern boundary of the site. The bedrock floor of the stream was consistent throughout it's course until being obscured by sediment upon influence by the lake.

Wells MW-2, MW-3, MW-4, MW-6, MW-7, MW-10, MW-11, MW-13, MW-15, MW-16, and MW-17 were installed as Type II wells in the residuum. Wells MW-1, MW-5, MW-8, MW-9, MW-12, MW-14 and MW-18 were completed as Type II wells into rock. Groundwater was not encountered in the residuum at these well locations. Well DW-1 was installed as a Type III vertical delineation well, approximately 30 ft into rock, and approximately 24 ft below the first set of fractures encountered at MW-6 (the Type II well in closest proximity to DW-1). DW-2 was installed as a Type III vertical delineation well downgradient of MW-6 and adjacent to MW-11. Fractures were observed in each of the monitoring wells installed into rock. However, the number of apparent water bearing fractures appeared to be relatively few. Monitoring well construction diagrams have been included as Appendix III.

Monitoring wells MW-1, MW-3, MW-8, MW-9, MW-12, and MW-14 were completed with screen lengths greater than 10 ft. The wells described above, with the exception of MW-3, were completed into rock. During rock drilling activities, few fracture zones were encountered. The fractures that were encountered did not readily indicate the presence of water. In an effort to ensure that water was present in several of the well locations, the well was drilled through several fracture zones and twenty to thirty foot lengths of screen were utilized. The longer screen

lengths were also used in order to ensure that the screen length would not be submerged by the water table and would also cover all possible water bearing zones. In addition, given the relative relief across the site, the shallow bedrock, and the bedrock streams in close proximity, it was assumed that groundwater present in the fractures would be subject to significant head pressure. The extra screen lengths would also accommodate the rise in potentiometric surface due to head pressure in the well. This is evident at MW-8, MW-9 and MW-12 as the water level has risen to elevations exceeding the elevation at which fractures were encountered.

A structural analysis to determine the number and orientation of fractures at the site was conducted by KEMRON. The former quarrying activities and abandoned pit at the site provided more than adequate exposure of rock to conduct the structural analysis. A summary of the structural analysis is included as Appendix IV.

A very small percentage of the land surface area in the immediate vicinity of the investigation is covered by either asphalt or concrete surfacing. This is limited to the small parking lot located adjacent to the lodge building and the entrance road. Surface runoff at the site is controlled by surface topography and drains either into the quarry pit, stream or lake.

A complete round of water level measurements were collected on October 4, 2004. Based on these, depths to groundwater ranged from 7.62 ft below top casing (TOC) at MW-10 to 32.10 ft below TOC at MW-18. Figure 7 is a Potentiometric Surface Map devised using the May 24, 2004 groundwater levels. Groundwater flow is diverging to the northwest and northeast, in the general direction of the lake. A hydraulic gradient of 0.064 ft/ft was calculated utilizing the groundwater elevations at MW-9 and MW-16. A hydraulic gradient of 0.11 ft/ft was calculated utilizing the groundwater elevations detected at MW-1 and MW-2. These locations represent the two areas most parallel to the diverging groundwater flow directions.

The relative difference between potentiometric elevations at nested wells can provide data as to the vertical flow component in the aquifer. If groundwater is moving upward, discharge of groundwater is typically occurring. If groundwater is moving downward, the area can be characterized as being a recharge zone. Based on the difference between the potentiometric heads at MW-11 and DW-2 , it is apparent that discharge of groundwater is occurring in this area. It is likely that groundwater is discharging into the stream and lake.

SECTION 4
SOURCE AREA IDENTIFICATION

4.1 General Methodology

Given the uncertainty regarding the potentials source areas at the site, special importance was given to source area identification. This effort was complicated by the nature of the release (i.e. dumping of drums and other debris), the filling of portions of the property, and the elapsed time since the placement of the material occurred. Visual surveys of the property initially identified two main areas where drums were concentrated at or near the surface. These areas are shown on the Site Map included as Figure 3. These areas are located roughly between monitoring wells MW-1, MW-3 and MW-5, with second area of drums being located in the immediate vicinity of MW-6. These areas also exhibited a "hummocky" or terraced appearance, indicative of possible filling activities in the past. Though numbers of large trees are present in the drum areas, the areas could also be generally characterized by thick growth of shrub and hedge type vegetation.

Numerous visual reconnaissances of the area were conducted by KEMRON personnel. A survey of the park premises extending roughly from the western park boundary north of the entrance road to the eastern boundary near the entrance to quarry was conducted. The areas where debris was observed at the surface, coupled with the unnatural topographical appearance, is limited to the area roughly on a line north of the western edge of the main lodge building to the lake, extending eastward to roughly the sharp left curve in the gravel road located immediately north of the building. Limited test pitting was conducted in this area to determine if significant amounts of buried drums and other debris were readily apparent. An electromagnetic (EM) survey of the area was conducted on April 1 through 4, 2004. Lastly, soil description and refusal data obtained during the installation of monitoring wells and DPT borings also reveals useful information pertaining to potential source areas.

A third area of surficial drums was discovered while laying out the grid for the EM Survey on April 2, 2004. This area is in the general vicinity of DPT borings GP-25 through GP-27 and monitoring well MW-14. This area, and the area immediately to the west, is thickly covered with hedge and honeysuckle with substantial gullied areas. Therefore, substantial clearing would have been required in this area to allow access for the EM survey equipment. This drum area is also shown on the Site Map. The EM Survey was not extended over this third area since the metal drums and containers would have interfered with the equipment.

4.1.1 Test Pitting

Limited test pitting was conducted on March 10 and 11, 2004. The test pitting was conducted using a mini-excavator capable of advancing an excavation to a depth of approximately 4-6 ft below grade. Test pitting was not conducted in areas where surficial soil staining was evident. A total of 14 test pits were conducted. Only one, identified as ED-14, revealed the presence of drums. In addition, PID readings were obtained during the test pitting process and concentrations exceeding background levels were only detected at the ED-14 location. The location of ED-14 is shown on Figure 3. Approximate locations of the test pits are shown on Figure 8. A soil sample was collected at ED-14 at a depth of approximately 6 ft. Elevated concentrations of VOCs,

RCRA Metals and SVOCs, along with lesser concentrations of PCBs and Herbicides were detected in the sample. Soil results are summarized in Tables 1A though 4A, respectively. The ED-14 excavation was lined with 6 mil plastic. Plastic was also used to cover the area surrounding the excavation to prevent runoff and any downgradient migration of contaminants during rainfall events. A sample of the soil excavated at this location was also collected for TCLP and RCRA Characteristics analysis. Results of the analyses revealed the soil to be non-hazardous.

4.1.2 EM Survey

An EM Survey was conducted on April 1 through April 4, 2004 by KEMRON. A Geonics Ltd. EM31 Terrain Conductivity Meter was utilized to conduct the survey by mapping milliohms/meter on a grid pattern that was layed out prior to collecting measurements. The EM31 measures the relative conductivity of the subsurface media. The higher conductivity readings may be the result of buried metal debris, shallow competent bedrock and/or groundwater contaminant plumes. The grid utilized was set up on 20 ft centers with conductivity measurements collected on the nodes of the grid. A 10 ft grid pattern was utilized in areas where the most drums were observed at the surface and in the areas that exhibited the most unnatural terrain. A numbering system to identify grid nodes was devised prior to collecting measurements. Measurements were collected and recorded in the fieldbook. The grid was then overlaid on the Site Map and the conductivity readings contoured.

Results of the survey indicate the presence of two anomalous areas. One is oriented east-west and extends roughly from the HA-9 hand auger boring location to approximately 25 ft from MW-2. The second area is oriented north-south and extends roughly from the GP-9 soil sampling location to MW-4. These areas roughly correlate with the areas of drums discovered at the surface, as well as many of the most elevated soil concentrations. Given that background readings were detected at grid nodes in the immediate vicinity of MW-6, it is likely that the anomalous areas are not solely due to groundwater contaminant plumes. In addition, the vertical capability of the instrument extends to approximately 18 ft below grade. Depths to groundwater in most of the area surveyed exceed or are approximately equal to 18 ft below grade. Though the visible 55 gallon drums in these areas had been removed at the time of the EM Survey, it is possible that the remaining metallic debris (i.e. paint cans, gasoline cans, oil cans, etc) in these areas may have influenced the results. Elevated concentrations of lead, barium and other metals in this area may also have affected the results. Figure 9 displays the results of the EM Survey.

4.1.3 Borings/Wells

Evaluation of potential source areas can also be conducted by utilizing the soil descriptions obtained during the advancement of soil borings. Fill was noted at monitoring well locations MW-1, MW-2, MW-5, MW-6 and MW-12, as well as numerous soil borings. Areas of fill are depicted on the cross sections included as Figures 4, 5 and 6. Fill extending to the top of rock was not noted at these well locations. The fill material generally graded into undisturbed saprolite at depths ranging from 6 ft below grade at MW-12 to 8 ft below grade at MW-1, MW-2 and MW-6. This area roughly coincides with the anomalous areas detected during the EM survey. It is assumed that no drums or other debris could exist to below the level of the saprolite.

In addition, during the advancement of eleven hand auger boring locations, over twenty DPT borings and sixteen monitoring wells, no evidence of refusal on any object other than rock was noted with the exception of the HA-3 location. The drum encountered during the advancement of HA-3 was less than 1ft below the surface and was subsequently removed after the drum was exposed during the test pitting (ED-14).

4.1.4 Conclusions

Based on the results of the test pitting, EM survey and the boring advancement, it is believed that the most substantial source areas at the site consisted of the areas of drums at or near the surface. Given the amount of fill at the site, it is possible that the anomalous areas detected during the EM Survey represent potential buried drums and other debris. However, refusal on any object other than rock in these areas was not suspected. Test pitting in these areas did not reveal the presence of drums other than the previously mentioned ED-14 location. A source removal action in the form of drum removal has taken place at the site and will be discussed subsequently in this report.

SECTION 5
SOIL INVESTIGATION

5.1.1 GENERAL METHODOLOGY

In order to determine worst-case concentrations in the areas where drums were present on the surface, as well as to determine the COI since the contents of the drums was unknown, a total of eleven hand auger borings (HA-1 through HA-11) were advanced at the site on March 8 and 9, 2004. The purpose of these hand auger borings was to identify worst case concentrations and the COI. These hand auger samples were collected from the areas where major concentrations of drums have been discovered at or near the surface and/or where significant areas of discolored soil were identified. These hand auger samples were collected as part of the initial assessment at the site. This initial assessment consisted of the eleven hand auger borings, the collection of sediment samples, a receptor survey and the installation of six monitoring wells.

The hand auger borings were advanced using a standard stainless steel hand auger bucket attached to a 4ft rod and handle. The hand auger equipment was decontaminated prior to initiating the assessment activities. A surficial soil sample was collected at each location at a depth of approximately 0-0.5 ft for analysis for RCRA Metals by EPA Method SW6010B and 7471 (Mercury). This sample was placed into a single 4 oz laboratory supplied glass jar. The sample was labeled and entered onto the chain of custody. The boring was then advanced to a depth of 2 ft below grade or until refusal (whichever was the lesser depth). A sample was then collected for laboratory analysis for VOCs by EPA Method SW8260B, SVOCs by EPA Method 8270C, PCBs by EPA Method SW8082, and Pesticides by EPA Method 8081A. This consisted of placing three five gram aliquots of soil into three pre-weighed laboratory supplied vials. Two of the vials contained sodium bisulfate solution and one contained a methanol solution for low level and mid-level analysis of VOCs, respectively. Additionally, four 4 oz glass jars were submitted for VOC dry weight and the remaining analyses. The sample containers were then placed into plastic bags, placed on ice in a laboratory supplied cooler, and entered on the chain of custody. The samples were couriered to Analytical Environmental Services, Inc. (AES) in Atlanta, Georgia for analysis.

Each boring location was flagged subsequent to sampling and the appropriate sampling location designation written in indelible ink to aid in surveying the site. The cuttings generated during the borings were placed back into the boring.

The sampling equipment was decontaminated between each boring location by washing with an alconox solution followed by a deionized water rinse. Decontamination water was collected and placed into a 55 gallon drum for disposal. Each sampler wore disposable latex gloves during the sampling. A new pair of gloves were worn at each sampling location.

In order to delineate the impacted soil detected during the initial assessment phase, and to assess the potential source areas identified during the EM survey, an expanded assessment was initiated on May 6, 2004. The expanded assessment consisted of the advancement of twenty-six DPT borings, the collection of five surface water samples, and the installation of ten additional monitoring wells. Additional assessment activities were conducted September 28-29, 2004. This

included the advancement of eighteen GeoProbe borings to provide additional assessment and delineation of chlorinated pesticides and herbicides, the collection of TCLP samples, the installation of four additional monitoring wells and the collection of surface water samples from the quarry.

5.1.1 INITIAL ASSESSMENT SOIL RESULTS

Hand auger borings were installed in the worst case locations that had been identified at the site as of March 8, 2004. A total of eleven hand auger borings were advanced. The surficial soil samples collected at each boring were designated as the appropriate boring number, followed by a "-1". For example, the initial boring was designated as HA-1, and the surficial sample as HA-1-1. The deeper sample from each boring, collected at approximately 2 ft below grade, was then designated as HA-1-2.

Detectable concentrations of RCRA Metals were detected in each of the samples collected. A more detailed description of the analysis used to derive background concentrations for the respective metals is included as Appendix V. Metals concentrations in soil are summarized in Table 1A. Hand auger, GeoProbe and monitoring well sampling locations are shown on Figure 3. Arsenic, Barium, Cadmium, Chromium, Lead, Selenium and Mercury were detected at concentrations exceeding each respective background concentration. The most elevated concentrations were detected at the HA-9 location. Laboratory analytical reports for soil samples collected during the Initial Assessment are included as Appendix VI.

Numerous VOCs and SVOCs were detected in the HA-1 through HA-11 soil sampling locations. Soil VOC concentrations are summarized in Table 3A. Soil SVOC concentrations are summarized in Table 4A. The most elevated VOC concentrations consisted primarily of toluene and xylenes. Detectable concentrations of chlorinated ethenes was primarily limited to the area around MW-6, DW-1 and DW-2. PCB and Pesticide concentrations are summarized in Table 5A. Trace concentrations of PCBs and Pesticides were detected in a limited number of samples collected during the Initial Assessment phase of work. Laboratory analytical reports for soil samples collected during the Initial Assessment are included as Appendix VI.

Soil samples were also collected during the installation of monitoring wells MW-1 through MW-6. Monitoring well locations are shown on the Site Map included as Figure 3. Soil samples were collected during well installation using a 2 ft stainless steel split spoon sampler and hollow stem auger techniques. Samples were collected at five foot intervals until encountering the groundwater table or auger refusal. The sample was logged and classified in the field book. Field screening was conducted by placing a portion of the sample in a sealable plastic bag. The plastic bags were placed in the sun and allowed to warm for a period of approximately thirty minutes following collection. The sample was then field screened using a photo-ionization detector (PID) by inserting the PID probe tip into the bag and recording the maximum concentration. PID readings are recorded on the Boring Logs included as Appendix III. The PID was calibrated at the beginning of each field day. The sample exhibiting the highest PID reading was submitted for laboratory analysis. In the event that PID readings above background were not detected in a sample, the deepest sample collected from above the water table was submitted to the laboratory. The shallowest sample collected at each well location was submitted for RCRA

Metals analyses. Sample collection and preservation methods were the same as those described above. Soil analytical results are summarized in Tables 1A through 4A. Laboratory analytical reports and chain of custody documentation for the initial assessment soil sampling are included as Appendix VI.

5.1.2 EXPANDED ASSESSMENT SOIL ANALYTICAL RESULTS

The expanded assessment soil sampling activities were conducted May 6 through May 8, 2004. DPT was utilized to advance the soil borings in various locations at the site. The DPT boring locations were designed to horizontally delineate the impacted soil detected during the initial assessment, vertically delineate the impacted soil detected during the initial assessment, and to further assess potential source areas. Horizontal delineation borings included GP-1, GP-2, GP-3, GP-6, GP-7, GP-8, GP-9, GP-11, GP-13, GP-15, GP-16, GP-18, GP-19, GP-20, GP-28 and GP-30. Vertical delineation borings included GP-4, GP-5, GP-10, GP-12 and GP-26. Boring GP-4, GP-5, GP-10 and GP-12 were advanced roughly in a line across the areas where the most impacted soil had previously been detected during the Initial Assessment phase. GP-26 was advanced roughly in the center of the area of drums and other debris discovered in an overgrown area during the EM Survey. DPT borings GP-21, GP-22, GP-25, GP-26 and GP-27 were utilized to assess additional potential source areas. Soil samples were also collected during the installation of monitoring wells MW-7, MW-9, MW-11, and DW-1. The samples collected at DW-1 were also utilized as additional vertical delineation samples. The soil samples collected at wells MW-7 and MW-9 provided additional background RCRA Metals data. Soil samples were not submitted from monitoring well locations MW-8 and MW-12 as these locations were intended to be groundwater delineation points. The background concentrations of RCRA Metals will be discussed subsequently in this report. Locations of the DPT borings are shown on Figure 3.

The soil samples obtained from the DPT borings were collected by pushing a closed sampling tube with a plastic liner to a desired depth, unlocking the tip of the tube, and then pushing the tube through the desired depth. Continuous sampling of the DPT borings (labeled GP-1, etc) was conducted using a 5 ft macro core sampling device. Samples were collected until encountering groundwater, refusal, or 20 ft below grade, whichever was the lesser depth. Sampling procedures were the same as those outlined previously in this section. Probe refusal was encountered at numerous DPT boring locations, at depths ranging from 5 ft below grade to 20 ft below grade.

The soil samples collected at the horizontal delineation borings were submitted for laboratory analysis for RCRA Metals by EPA Method 6010B and 7471 (Mercury), VOCs by EPA Method 8260 and SVOCs by EPA Method 8270. A sample was collected at 0-2 ft below grade from the initial sampling interval at each boring location for RCRA Metals analysis. RCRA Metals, VOCs, SVOCs, PCBs, Pesticides and Herbicides were analyzed in the samples collected from the vertical delineation borings, as well as the DPT borings installed to assess potential additional source areas. The soil samples collected during the installation of monitoring wells were submitted for laboratory analysis for RCRA Metals (0-2 ft), VOCs, and SVOCs. The vertical delineation samples collected during the installation of DW-1 were submitted for the full suite of analyses.

The samples collected from the DPT borings advanced in the areas to assess potential additional sources indicated concentrations of VOCs, SVOCs, PCBs, Pesticides and Herbicides that were primarily below laboratory reporting limits (BRL) with the exception of GP-26. GP-26 was advanced through the center of the area of surficial drums discovered during the EM Survey. Elevated concentrations of toluene, ethylbenzene and xylenes were detected, while the chlorinated ethenes were BRL. Elevated concentrations of SVOCs including naphthalene and butyl benzyl phthalate were detected. A trace concentration of the herbicide 2,4-DB (0.077 mg/kg) was also detected at GP-26. Soil analytical results are summarized in Tables 2A through 5A. Laboratory reports and chain of custody documentation from the soil samples submitted during the expanded assessment are included as Appendix VI.

An additional round of soil assessment was conducted at the site on September 29, 2004. The purpose of this round of soil sampling was to provide additional assessment of source areas for PCBs, Pesticides and Herbicides in addition to providing additional delineation of these compounds. Two GeoProbe borings were also advanced in the locations of the worst case soil sample locations detected during previous assessment activities to collect samples to be submitted for TCLP analysis. These locations were selected in order to compare the worst case total concentrations detected to the results of the TCLP analysis in order to revise the RRS for soil. A total of eighteen GeoProbe borings were installed on September 29, 2004 (designated as GP-31 through GP-48). GeoProbe borings GP-31 through GP-34 and GP-36 were installed in areas anticipated to provide delineation of the minor PCB and Pesticide concentrations detected at the ED-14 location. GP-35 was installed at the ED-14 location to provide vertical delineation of the impacted soil previously detected. GeoProbe borings GP-37 through GP-41 and GP-43 and GP-44 were advanced in the vicinity of MW-5 and MW-6 where minor concentrations of Pesticides were detected. GP-42 was advanced immediately adjacent to MW-6 in order to collect a worst case sample (13-15 ft) for TCLP analysis. Boring GP-45 was advanced at the former GP-26 location in order to replicate the GP-26 15-20 ft sample for TCLP analysis. Borings GP-46 through GP-48 were advanced in locations anticipated to provide delineation of the minor pesticide/herbicide concentrations previously detected at GP-26. GeoProbe boring locations are shown on Figure3.

Each of these GeoProbe borings, with the exception of GP-35, GP-42 and GP-45, were completed as 5 ft borings. Samples were collected using a 5 ft macro-core sampling device. Each sample was split into three portions. The portion representing the 0-0.5 ft interval was designated as "A" (GP-31A for example). A second portion representing the 2-2.5 ft section was designated as "B". The third portion representing the 4.5 to 5 ft interval was designated as "C". A sample was collected at 7-9 ft at the GP-35 location to provide vertical delineation of the PCB impacted soil previously detected at the ED-14 location. A deeper sample could not be collected due to probe refusal. The samples were collected using the methodology previously described. The samples were examined for lithologic description and logged in the field book. The samples were placed into one 4 oz and one 2oz jar and immediately placed on ice. The samples were placed in coolers on wet ice and shipped to the KEMRON Analytical Laboratory in Marietta, Ohio for analysis under chain of custody.

Results of the additional GeoProbe assessment conducted on September 29, 2004 indicate that minor concentrations of PCBs are present in shallow soils in several areas across the site. The

most elevated concentrations were detected at the ED-14 and GP-37 sampling locations. The detectable concentrations of PCBs were reported only in the "A" and "B" interval samples with the exception of a trace concentration of Aroclor 1260 detected at the "C" interval (5 ft) at the GP-37 location. Figure 10 is a Total PCBs Isoconcentration Map (0-2 ft) and Figure 11 is a Total PCBs Isoconcentration Map (2-5 ft). Since only a trace concentration of PCBs was detected in a single sample, an Isoconcentration Map for the >5 ft interval has not been prepared. Pesticides were detected in samples collected primarily in the general vicinity of monitoring wells MW-5 and MW-6. The detectable concentrations of pesticides were detected in only the "A" and "B" interval samples. Figure 12 is a Total Pesticides Isoconcentration Map (0-2 ft) and Figure 13 is a Total Pesticides Isoconcentration Map (2-5 ft). Pentachlorophenol was the most common herbicide reported in the soil samples and represented the highest concentrations as well. Only trace concentrations of other herbicides were detected elsewhere. Figure 14 is a Total Herbicides Isoconcentration Map (0-2 ft), Figure 15 is a Total Herbicides Isoconcentration Map (2-5 ft) and Figure 16 is a Total Herbicides Isoconcentration Map (>5 ft). PCB/Pesticide and Herbicide results in soil are summarized in Table 4A. Laboratory analytical reports and chain of custody documentation have been included as Appendix XI.

A separate figure for each RCRA Metal showing isoconcentration contours has been prepared. A contour for the calculated background concentration is also depicted on each figure. The figure number for the corresponding metal is as follows; Total Arsenic in Soil Figure 17, Total Barium in Soil Figure 18, Total Cadmium in Soil Figure 19, Total Chromium in Soil Figure 20, Total Lead in Soil Figure 21, Total Selenium in Soil Figure 22, and Total Mercury in Soil Figure 23.

Figures depicting VOC concentrations in soil have been broken down in the following manner; Total Chloroethanes in Soil (0-2 ft) as Figure 24, Total Chloroethanes in Soil (2-5 ft) as Figure 25, Total Chloroethanes in Soil (>5 ft) as Figure 26, Total VOCs in Soil (0-2 ft) as Figure 27, Total VOCs in Soil (2-5 ft) as Figure 28 and Total VOCs in Soil (>5 ft) as Figure 29. The Total VOC Isoconcentration Maps are less the chlorinated ethanes. Figures depicting SVOC concentrations in soil have been broken down in the following manner; Total SVOCs in Soil (0-2 ft) as Figure 30, Total SVOCs in Soil (2-5 ft) as Figure 31 and Total SVOCs in Soil (>5 ft) as Figure 32. Figure 33 is Cross Section A-A' with VOC Concentrations in Soil, Figure 34 is Cross Section A-A' with SVOC, PCB, Pesticide and Herbicide Concentrations in Soil, Figure 35 is Cross Section B-B' with VOC Concentrations in Soil and Figure 35A is Cross Section B-B' with SVOC, PCB, Pesticide and Herbicide Concentrations in Soil.

Based on the results obtained from the borings advanced in areas anticipated to provide horizontal delineation, adequate delineation has been achieved. This is evidenced by the VOC and SVOC concentrations being BRL and the RCRA Metals concentrations being below background as depicted on the figures. It is proposed that butyl benzyl phthalate, barium and the BTEX constituents be considered indicator compounds. Given that these compounds represent the most widespread contaminants at the site, it is assumed that complete delineation of the indicator compounds will result in complete delineation of other compounds. In addition, the area where either RCRA Metals, VOCs, and SVOCs exceed RRS is significantly larger than the area of PCB, Pesticide and Herbicide Exceedances of RRS. Therefore, these compounds will be remediated upon the successful remediation of the indicator compounds. Total VOC and SVOC delineation was not completely achieved in the area of initial assessment sampling location HA-

11. However, it is believed this area is limited in extent based on the results obtained at GP-7, MW-2, MW-3, and GP-3. Additional delineation is limited by the steep bank and the lake. The sediment sample collected immediately downslope of the HA-11 area also provides additional delineation.

Acetone was the only VOC constituent detected in numerous soil samples (i.e. HA-7, GP-16, GP-22 and GP-30). Given the relatively low levels of acetone detected, coupled with the volatility of acetone, it is assumed that these concentrations are either the result of chemical reactions with the sodium bisulfate preservative, chemical reactions with humic material in the sample and/or cross contamination in the laboratory. Based on this, it is assumed that in samples where Acetone was the lone constituent detected, the results are not indicative of true soil conditions.

Vertical delineation was successful at numerous sampling locations such as GP-4, GP-10 and GP-27. However, vertical delineation was not achieved in locations such as DW-1, where it is assumed that impacted soil extends to the top of rock. Butyl benzyl phthalate was most the most common constituent not delineated to background. However, the concentrations are below the Type 2 RRS proposed for the compound. Metals concentrations exceeding background appear to be confined to the upper 2-5 ft of the soil profile.

SECTION 6.0
SEDIMENT INVESTIGATION

6.1 GENERAL METHODOLOGY

Given the proximity of the lake to the impacted soils at the site, the possibility for the deposition of impacted soil into the lake as sediment during stormwater runoff exists. The surface topography in the general area of greatest soil impact slopes to the north with slight irregularities to the lake. A very steep slope is located along the majority of the lake bank. The purpose of the sediment sampling was to assess potential worst-case locations, and then conduct follow-up sampling if deemed necessary. The worst case surficial soil samples were collected at hand auger locations HA-5, HA-9 and HA-11. Overall, these sampling locations indicated the most elevated surficial concentrations of VOCs, SVOCs and RCRA Metals. Two sediment samples were collected on March 9, 2004 using a bucket type sediment sampling device attached to an eight foot handle. Sediment sampling location SS-1 was located directly downslope from the HA-11 sampling location. Sediment sample SS-2 was collected where a drainage feature in the form of a small gully empties into the lake. This small feature would receive stormwater runoff from the areas surrounding HA-5 and HA-9.

The sediment samples were laboratory analyzed for VOCs by EPA Method 8260, SVOCs by EPA Method 8270, PCBs by EPA Method 8082, Pesticides by EPA Method 8081A and RCRA Metals by EPA Method 6010B/7471. Given that concentrations of Herbicides were BRL in the surficial soil samples collected during the initial assessment, the sediment samples were not analyzed for these constituents. It is believed that the greatest likelihood for accumulation in sediment would be either SVOCs or RCRA Metals. The locations of the sediment sampling points are shown on Figure 3.

6.1.1 Conclusions

Detectable concentrations of barium, lead and chromium were detected in the both sediment samples. However, the concentrations were below the respective background concentrations. Background concentrations will be discussed subsequently in this report. Concentrations of SVOCs, PCBs and Pesticides were BRL in each of the sediment samples. VOC concentrations were BRL in each of the sediment samples with the exception of an acetone concentration of 0.076 mg/kg at SS-1 and an isopropylbenzene concentration of 0.011 mg/kg at SS-2. Given the volatile nature of these compounds, it is unlikely that these are actually present in the sediment at the lake. Sediment sampling results are summarized in Tables 2A through 5A. Laboratory analytical reports and chain of custody documentation have been included as Appendix VI.

SECTION 7
GROUNDWATER INVESTIGATION

7.1 GENERAL METHODOLOGY

In order to determine worst-case groundwater concentrations and COI, six permanent monitoring wells were installed at the site on March 17-19, 2004. These wells were installed in the immediate area, as well as topographically downgradient of the drum areas initially discovered at the site. Wells MW-1, MW-5, and MW-6 were installed in, or in as close proximity as possible, the areas where drums were discovered. Wells MW-2, MW-3 and MW-4 were installed topographically downgradient of these areas, between potential sources and the lakes. The wells were also used to develop a Potentiometric Surface Map to determine groundwater flow direction. The wells were installed using a combination of traditional hollow stem auger techniques and air rotary hammer. Auger refusal was encountered at depths ranging from approximately 5 ft below grade at MW-1 to over 20 ft at several well locations. Auger refusal was not encountered prior to encountering the groundwater table at wells MW-2, MW-3 and MW-4. Boring Logs and Monitoring Well Construction Diagrams have been included as Appendix III.

The monitoring wells were developed by manual bailing subsequent to installation. A minimum of three well volumes were purged from the well, or the well was purged dry, allowed to recharge and purged dry again. Purge water was placed into 55 gallon drums and staged onsite for subsequent disposal. The wells were allowed to equilibrate for a minimum of twenty four hours prior to sampling. Liquid levels were measured at each well and well volumes calculated. Three well volumes were again purged from each well using a dedicated disposable bailer. The wells were sampled for VOCs by EPA Method 8260, SVOCs by EPA Method 8270, Pesticides by EPA Method 8081A, Herbicides by EPA Method 8151A, PCBs by EPA Method 8082, RCRA Metals by EPA Method 6010B, Mercury by EPA Method 7471 and Ethylene Glycol by EPA Method 8015. Two 40 mL vials preserved with hydrochloric acid, one 250 mL plastic container preserved with nitric acid, and ten 1 L amber unpreserved jars were utilized as the sample containers. The samples were placed immediately on ice and shipped by courier to AES in Atlanta, Georgia under proper chain of custody. The wells were sampled on March 22 through 23, 2004.

Based on the results of the initial assessment monitoring well installation (to be discussed subsequently in this report), additional monitoring well installation and groundwater sampling was proposed as part of the expanded assessment. A total of six wells (MW-8, MW-9, MW-10, MW-11, MW-12 and MW-13) were proposed to provide horizontal delineation. The downgradient locations of MW-10 and MW-11 were limited due to the lake itself and the steep slope adjacent to walking trail and the lake. Additional downgradient delineation to the North of MW-4 was not feasible due to the steep slope and the lake. Limited clearing was conducted to facilitate the installation of the majority of the wells installed during the expanded assessment. However, major clearing and filling of gullied areas would have been required to locate MW-13 any further to the North. MW-7 was installed well away, and cross-gradient, from the anticipated impacted areas to provide a sentinel point as well as background concentrations for RCRA Metals. MW-14 was installed topographically downgradient and in as close proximity as

possible to the area of drums discovered during the EM Survey. The location of MW-12 was limited by the remaining quarry pit which is located immediately to the south of the chain link fence noted on the Site Map (Figure 3).

In order to provide vertical delineation, a total of three wells were originally proposed. A Type III double cased well was proposed to be installed immediately downgradient of the MW-6 location (DW-1). Two Type II wells were proposed to set with a 2.5 ft section of screen on the top of rock. One of these wells was to be nested with the existing MW-4 location and the second with the proposed MW-11 location. However, numerous attempts were made to install the proposed deep well at the MW-4 location. Auger refusal was encountered at depths ranging from 14 to 20 ft bgs. Given that MW-4 was set at a total depth of 20 ft with 10 ft of screen, setting a deep well in this location would result in screening virtually the same zone as that already sampled at MW-4. Given this information, it was decided to convert the proposed top of rock well nested with MW-11 into a Type III double cased well. The well was designated as DW-2. The double cased wells are installed to prevent potential "drag down" during drilling efforts, and to minimize water infiltration from groundwater within the soil at the soil/rock interface through fractured bedrock conditions. A four inch diameter outer casing was set at each of these well locations because a four inch casing typically results in a better "seal" at the soil/rock interface. Boring Logs and Monitoring Well Construction Diagrams have been included as Appendix III.

The wells were developed by manual bailing subsequent to installation. A minimum of three well volumes were purged from each well and placed into 55 gallon drums, or the wells were purged until they became acceptability free of turbidity. Each of the monitoring wells at the site were sampled for VOCs by EPA Method 8260, SVOCs by EPA Method 8270 and RCRA Metals by EPA Method 6010B as part of the expanded assessment. Monitoring wells MW-10, MW-11, DW-1, and DW-2 were additionally analyzed for PCBs by EPA Method 8082, Herbicides by EPA Method 8151 and Pesticides by EPA Method 8081A. Monitoring well MW-14 was also proposed to be analyzed for PCBs, Herbicides and Pesticides. However, due to the extremely slow recharge rates, only Herbicides analysis was conducted in addition to VOCs, SVOCs, and RCRA Metals. The invert elevation of the well was significantly lower than nearby wells, as well as the creek located to the north and east. However, the fractures encountered while rock drilling this well seemed to be dry rather than water bearing. These wells were slated for the additional analysis since they were in either in close proximity or downgradient of known or suspected source areas. When it was determined that sufficient groundwater volume would not be encountered at MW-14, the decision to run Herbicides in lieu of Pesticides and/or PCBs was made based on the fact that minor concentrations of Herbicides had been detected in the soil sample collected from the center of the drum area discovered during the EM Survey. VOCs, SVOCs, RCRA Metals, PCBs, Herbicides and Pesticides were analyzed for on the sample collected from MW-6 as part of the expanded assessment based on the elevated concentrations previously detected at this location.

Based on the results of the May 19, 2004 sampling event, four additional wells were installed at the site on September 28 and 29, 2004. Monitoring wells MW-17 and MW-18 were installed west of MW-8 in order to delineate the trace concentrations of caprolactam detected at this location. Installing MW-18 any further South was not feasible due to a steep embankment surrounding the parking lot at the main building and steep slopes due west of the main building.

Monitoring wells MW-15 and MW-16 were installed in order to fill in the data gap between MW-10 and MW-13. Boring Logs and Well Construction Diagrams have been included as Appendix III.

7.1.1 INITIAL ASSESSMENT GROUNDWATER RESULTS

Detectable concentrations of VOCs were detected at MW-1 and MW-3 through MW-6. MW-2 reported VOC concentrations that were BRL. Only trace concentrations of a small number of VOCs were detected at MW-1, MW-3, and MW-4. MW-1 reported a carbon disulfide concentration of 7 ug/L and an acetone concentration of 30 ug/L. MW-3 reported trace concentrations of toluene (80 ug/L), ethylbenzene (10 ug/L) and xylenes (57 ug/L). MW-4 reported only slightly higher concentrations of toluene, ethylbenzene and xylenes. MW-5 also reported detectable concentrations of the same constituents, but at more elevated concentrations (1,220 ug/L xylenes). The most elevated concentrations of VOCs were detected at the MW-6 location. Concentrations of toluene, ethylbenzene and xylenes of 74,000 ug/L, 7,100 ug/L and 38,600 ug/L, respectively, were detected at the MW-6 location. A benzene concentration of 9.5 ug/L was also detected as well as minor concentrations of other compounds typically associated with petroleum (i.e. isopropylbenzene, cyclohexane, etc) were also reported at MW-6. PCE and it's breakdown products TCE, DCE, and VC were also detected at MW-6 with respective concentrations of 690 ug/L, 640 ug/L, 430 ug/L and 160 ug/L. A complete summary of VOC concentrations in groundwater can be found in Table 2B. Laboratory analytical reports and chain of custody documentation have been included as Appendix VII.

Detectable concentrations of the following SVOC constituents were detected at MW-6; 2,4-Dimethylphenol (100 ug/L), 2-Methylphenol (230 ug/L), 4-Methylphenol (280 ug/L) and acetophenone (61 ug/L). Caprolactum was detected at monitoring wells MW-1 and MW-2 at concentrations of 330 ug/L and 22 ug/L, respectively. Minor concentrations of butyl benzyl phthalate and Di-n-butyl phthalate were detected at MW-5. SVOC concentrations in groundwater are summarized in Table 3B. Laboratory analytical reports and chain of custody documentation are included as Appendix VII.

Trace concentrations of chlorinated pesticides and herbicides were detected in groundwater samples collected during the initial assessment. A delta-BHC concentration of 0.11 ug/L was detected at MW-1. The herbicide 2,4-D,B was detected at 0.82 ug/L at MW-1, 1.5 ug/L at MW-3 and 1.1 ug/L at MW-6. Other pesticides and herbicides were BRL. PCBs and ethylene glycol concentrations were BRL in the samples submitted for analysis. Pesticide, herbicide and PCB concentrations in groundwater are summarized in Table 4B. Laboratory analytical reports and chain of custody documentation are included as Appendix VII.

RCRA Metals analysis of groundwater samples collected from MW-6 indicated detectable concentrations of barium in each of the wells sampled. The concentrations ranged from 93.2 ug/L at MW-3 to 189 ug/L at MW-5. Concentrations of other RCRA Metals were BRL in the samples collected from wells MW-1 through MW-6 as part of the initial assessment. RCRA Metals analytical results in groundwater area summarized in Table 1B. Laboratory analytical reports and chain of custody documentation have been included as Appendix VII.

7.1.2 EXPANDED ASSESSMENT GROUNDWATER RESULTS

VOC concentrations were BRL at shallow monitoring well locations MW-2, MW-7, MW-8, MW-9, MW-10, MW-13 and MW-14. Minor concentrations of benzene, toluene, ethylbenzene and xylenes (BTEX) were detected at MW-12. Trace concentrations of toluene, ethylbenzene, and xylenes were detected at MW-3, MW-4 and MW-5. Trace concentrations of toluene and ethylbenzene, along with a slightly elevated concentration of xylenes (2,490 ug/L) were detected at MW-11. Elevated concentrations of toluene, ethylbenzene and xylenes were again detected at MW-6. However, the concentrations had decreased since the initial sampling event in March 2004. PCE, TCE, DCE and VC were also detected at MW-6. Chlorinated solvent compounds have not been detected at any well location other than MW-6. VOC groundwater analytical results are summarized in Table 2B. Laboratory analytical reports and chain of custody documentation have been included as Appendix VII.

Minor concentrations of SVOCs were detected at MW-2, MW-6, MW-8, MW-11, MW-12, MW-13, and MW-14 during the groundwater sampling event conducted as part of the expanded assessment. Polynuclear aromatic hydrocarbons (PAHs), phenols and phthalates and caprolactum were detected in groundwater samples collected as part of the expanded assessment. MW-3, MW-4, MW-5, MW-7, MW-9, and MW-10 reported SVOC concentrations that were BRL. Caprolactam represented the single SVOC compound detected at MW-1, MW-2, MW-8, MW-12, and MW-13 at concentrations ranging from 22 ug/L at MW-2 to 280 ug/L at MW-12. Caprolactum is a compound typically associated with plastics. MW-6 indicated the most detectable SVOC compounds as well as the relatively most elevated concentrations. SVOC groundwater analytical results are summarized in Table 3B. Laboratory analytical reports and chain of custody documentation have been included as Appendix VII.

PCBs, Herbicides and Pesticides were BRL in each of samples submitted for analysis during the expanded assessment. PCB, Pesticide, and Herbicide groundwater analytical results are summarized in Table 4B. Laboratory analytical reports and chain of custody documentation have been included as Appendix VII.

RCRA Metals detected during the expanded assessment include barium at each of the well locations. The results were similar to those detected during the initial assessment. The highest concentrations of barium were detected in the duplicate sample collected from MW-4 (MW-4D) at 1,380 ug/L and MW-5 (701 ug/L). Lead was also detected in groundwater samples collected from the MW-5 (27.3 ug/L) and the duplicate sample (MW-4D) collected from MW-4 (276 ug/L). Chromium was also detected at MW-3 (10.5 ug/L) and the duplicate sample collected from MW-4 (100 ug/L). Cadmium was detected in the MW-5 sample at a concentration of 15.6 ug/L. While every effort was made to minimize the amount of sediment present in the samples, it likely the metals concentrations detected is due to the presence of sediment in the sample.

Vertical delineation well DW-1 was installed approximately 10 ft downgradient of MW-6. Refusal was encountered at MW-6 at 20 ft below grade, and at 22 ft below grade at DW-1. Groundwater was encountered above the soil/bedrock interface at MW-6. A four inch outer casing was installed and allowed to "cure" for approximately 48 hours. A two inch inner casing

was then installed through the outer casing utilizing air rotary techniques. Competent rock was encountered in the boring from approximately 22 ft below grade to approximately 37 ft below grade where a fracture zone approximately five inches thick was encountered. The presence of fractures was noted based on the amount of down hole pressure required to advance the boring. The boring was advanced past this fracture zone to a total depth of 44 ft below grade. A second fracture zone was encountered at approximately 41 ft below grade. A five foot section of screen was set at the bottom of the borehole. Well construction details and boring logs are included as Appendix III. DW-1 was developed by manual bailing until the formation water became clear of turbidity. DW-1 indicated concentrations of VOCs, SVOCs, PCBs, Pesticides and Herbicides that were BRL. Based on this, vertical delineation was successful in the vicinity of MW-6.

Vertical delineation well DW-2 was installed adjacent to MW-11 and directly downgradient of MW-6. Refusal was encountered at approximately 20 ft below grade. The borehole was advanced to a total depth of 30.4 ft below grade using air rotary techniques. The well was set at 30.4 ft with 5 ft of screen across the initial set of fractures encountered during the boring. Well construction followed the same protocol as that described for DW-1. Boring logs and well construction diagrams have been included as Appendix III. DW-2 indicated elevated concentrations of toluene, ethylbenzene and xylenes. This would seem to indicate the fracture zone encountered at DW-2 is potentially connected to the groundwater in the residuum at MW-6. It is likely that the uppermost fractures in the bedrock or partially weathered rock are acting in concert with the shallow aquifer in the residuum. No chlorinated compounds were detected at DW-2. Based on this, additional vertical delineation was not conducted. Laboratory analytical reports and chain of custody documentation have been included as Appendix VII.

Based on the results of the expanded assessment, adequate horizontal delineation of VOCs at the site has been achieved. Minor concentrations of VOCs were detected at downgradient well locations MW-3, MW-4 and MW-11. However, additional downgradient monitoring well installation is not feasible due to the lake and steep slope. Surface water samples collected from the lake were BRL for VOCs. Minor VOC concentrations were also detected at MW-12. However, additional downgradient delineation in relatively close proximity to MW-12 was not deemed feasible due to it's proximity to the quarry pit.

Subsequent to the installation of the additional monitoring wells (MW-15 through MW-18) on September 28 and 29, 2004, an updated comprehensive sampling event was conducted on October 4 through 7, 2004. Each of the twenty existing monitoring wells was sampled for VOCs by EPA Method 8260, SVOCs by EPA Method 8270, and RCRA Metals by EPA Methods 6010B/7471. In addition, monitoring wells MW-3, MW-5, MW-14 and DW-1 were sampled for PCBs by EPA Method 8082, Pesticides by EPA Method 8081A and Herbicides by EPA Method 8151A. Monitoring wells MW-1, MW-2 and MW-4 were to be sampled for these analyses as well since the areas of herbicides and pesticides in soil samples were predominantly located in the vicinity of these wells. However, there was insufficient water volume in the wells to allow for sampling of these constituents. Concentrations of PCBs, Pesticides and Herbicides have been BRL in these wells during previous sampling events with the exception of 0.82 ug/L of 2,4-DB and 0.11 ug/L delta-BHC at MW-1. MW-14 was not analyzed for these constituents during the previous sampling event due to insufficient water volume and was therefore included during this round of sampling.

On October 4 through 7, 2004, KEMRON personnel sampled monitor wells MW-1 through MW-18, DW-1, and DW-2. Groundwater purging and sampling were conducted utilizing low flow methodology. Due to the large purge volumes for many of the monitor wells when compared to the low purge rates and the observed drawdown in monitor wells when purging at the lowest possible flow rates, low volume methodology was also employed during this sampling event. This methodology allows for select monitoring of chemical and physical properties of the sample medium to be used instead of strict well volume measurements to determine when a representative sample may be collected from a well.

Prior to purging, a full round of depth to water measurements were collected from all monitor wells. Total depth measurements were already available from the previous sampling event and drilling logs. The well volume for each well was calculated based on this data and groundwater flow direction was also determined from this data and the top of casing elevation data for each well.

Prior to initiation of purging, ¼" O.D. sample tubing was lowered to the appropriate depth. For monitor wells with screens that bridge the water table, the tubing was placed between the midpoint of the screened interval and the top of the water column. For monitor wells with submerged screens, the tubing was placed at the midpoint of the screened interval. The tubing was then attached to flexible silicon tubing and the pump-head of the peristaltic pump. A water level indicator was then lowered to the top of the water column to monitor depth to water during purging of the well. Purging was then initiated at the lowest possible flow rate achievable with the peristaltic pump. One well volume was removed from each well before starting to record stabilization parameters. During this time period the flow rate was also measured using a container of known volume and a stopwatch and then recorded. Purge rates ranged from 0.05 gallons per minute (gpm) to 0.15 gpm. Flow rates were monitored intermittently throughout the remainder of the purging process. Due to the local geology/hydrogeology of the project site resulting in slow recharge rates for the monitor wells, some wells experienced moderate drawdown during purging even at the lowest achievable flow rate. While drawdown was experienced in certain monitor wells during purging, only MW-1 was purged dry. Groundwater recharge did equilibrate with withdrawal in the remaining monitor wells after an initial drawdown period.

As discussed above, a variable speed peristaltic pump was used to purge each monitor well (except MW-18 discussed later). A Horiba U-22 water quality meter equipped with a flow-through cell set up on the back side of the pump and a LaMotte 2020 turbidity meter were utilized during purging of each well to measure the chemical and physical parameters every three to five minutes. The measurements were recorded on a groundwater sampling log and used to determine when pH, conductivity, temperature, dissolved oxygen (D.O.), and turbidity had stabilized indicating representative groundwater from the surrounding formation was being extracted by the peristaltic pump and the monitor well was ready to be sampled. Both the Horiba and LaMotte were calibrated prior to use each day according to manufacturer recommended procedures. Acceptable limits for groundwater stabilization and completion of purging are sample turbidity less than 10 NTU and three consecutive readings of the remaining parameters within the following limits:

pH	+/- 0.1 Standard Units
Conductivity	+/- 3%
Temperature	+/- 3%
D.O.	+/- 10%

Upon stabilization of parameters for each monitor well, groundwater samples were collected. Groundwater samples were collected directly from the peristaltic pump/sample tubing with the exception of the volatile organic compounds (VOCs) samples (EPA Method 8260). VOCs samples were collected by stopping the pump and removing the sample tubing from the well. The pump was then reversed pushing the water out of the tubing into the 40-ml vials. This method is sometimes referred to as the "straw-method" and prevents agitation of volatiles in the pump-head assembly. After sample collection the groundwater samples were placed in a cooler on wet ice, logged on a chain-of-custody and submitted to KEMRON's Environmental Laboratory in Marietta, Ohio for analysis. Samples collected from monitor wells MW-2 through MW-17, DW-1 and DW-2 were analyzed by EPA Methods 8260, 8270, and 6010. Samples from MW-3, MW-5, MW-14, and DW-1 were also analyzed by EPA Methods 8015 and 8082.

Groundwater sampling results are summarized in Tables 2B through 5B. Table 6 summarizes pertinent field sampling data. Groundwater analytical results are provided in Appendix VII and groundwater sampling logs are provided in Appendix VIII.

Two of the monitor wells could not be sampled as described above. MW-18 had a depth to water of 32.10-feet below top of casing. Due to the depth to water, a peristaltic pump could not be used to sample MW-18. A Grundfos Readiflo-2, which is a stainless-steel variable-speed submersible pump, was utilized for sampling of MW-18. With the exception of the type of pump that was used, the procedures for purging and sampling were identical to those described above for the peristaltic pump. The lowest achievable flow rate for the submersible pump was slightly higher than that of the peristaltic pump and the well was purged more than five well volumes to achieve a turbidity <10 NTUs. The decision to exceed five well volumes was made based on the continued reduction of turbidity throughout the purging process.

MW-1 was purged dry at the lowest flow rate achievable with the peristaltic pump and was allowed to recharge, then sampled. Due to the extremely slow recharge rate of MW-1; approximately 500 ml after being allowed to recharge overnight, not all proposed parameters could be collected for analysis. After sample collection, the groundwater samples were placed in a cooler on wet ice, logged on a chain-of-custody and submitted to KEMRON's Environmental Laboratory in Marietta, Ohio for analysis. Samples collected from monitor wells MW-18 and MW-1 were analyzed by EPA Methods 8260 and 6010. Samples collected from MW-18 were also analyzed by EPA Method 8270. Additional details can be found on the Groundwater Sampling Log for each monitor well provided as Appendix VIII.

Detectable concentrations of RCRA Metals were detected in each of the monitoring well sampled during October 2004. Barium was detected at each monitoring well location at concentrations ranging from 25 ug/L at DW-2 to 192 ug/L at MW-6. Other RCRA Metals were BRL at all monitoring well locations with the exception of a selenium concentration of 1.47 ug/L

at MW-1 and a chromium concentration of 3.1 ug/L at MW-18. RCRA Metals in groundwater data is summarized in Table 2B. Figure 37 is a Total Metals in Groundwater Isoconcentration Map. Based on the results of the October 2004 sampling event, RCRA Metals in groundwater at the site have been adequately assessed and delineated. Laboratory analytical reports and chain of custody documentation have been included as Appendix VII.

Detectable concentrations of VOCs were detected at eight of the monitoring well locations during the October 2004 sampling event. Consistent with previous sampling events, the most elevated concentrations were detected at the MW-6 location. Benzene, toluene, ethylbenzene and xylenes (BTEX) constituents constitute the greatest percentage of the VOCs detected. Chlorinated ethanes were detected at only the MW-6 location. MW-12 had previously reported 313 ug/L of Total VOCs (all BTEX constituents) during the May 2004 sampling event. However, during the October 2004 sampling event, only a toluene concentration of 5.41 ug/L was detected. Figure 38 is a Total Chlorinated Ethanes in Groundwater Isoconcentration Map devised using the October 2004 data. Figure 39 is a Total VOCs (Less Chlorinated Ethanes) in Groundwater Isoconcentration Map. VOCs in groundwater data is summarized in Table 3B. Laboratory analytical reports and chain of custody documentation have been included as Appendix VII. As previously discussed, additional delineation downgradient (North) of MW-4 and MW-11 is impractical due to the steep slope and proximity to the lake. Based on the updated results obtained at MW-12, additional delineation to the South of this location is not warranted. Chlorinated ethanes and Total VOCs have been successfully delineated at the site.

Detectable concentrations of SVOCs were detected at six of the monitoring well locations during the October 2004 sampling event. Total SVOC concentrations were less than 50 ug/L at five of the six well locations reporting detectable levels. The most elevated concentrations were detected at the MW-6 location. 2-4-Dimethylphenol, 2-Methylphenol and 4-Methylphenol were detected at concentrations of 166 ug/L, 377 ug/L and 326 ug/L, respectively at MW-6. Monitoring wells MW-17 and MW-18 were installed at the request of the Georgia EPD to delineate the 57 ug/L of caprolactam previously detected at MW-8. MW-8, MW-17 and MW-18 were BRL for SVOCs during the October 2004 sampling event. Trace concentrations of 6.19 ug/L and 7.28 ug/L, respectively, of Di-n-octylphthalate were detected at MW-15 and MW-16. Given the minor concentrations detected and the proximity of the wells to the streams and wetland areas, no additional delineation to the east of MW-15 or MW-16 is warranted at this time. SVOC concentrations in groundwater are summarized in Table 4B. Laboratory analytical reports and chain of custody documentation have been included as Appendix VII. Figure 40 is a Total SVOCs in Groundwater Isoconcentration Map. SVOCs are adequately defined at the site.

Detectable concentrations of PCBs, Pesticides, and Herbicides were not detected during the October 2004 sampling event with the exception of a Dichloroprop concentration of 2.61 ug/L at the MW-3 location. PCBs have not been detected in groundwater samples collected at the site. A 0.11 ug/L concentration of delta-BHC represents the only Pesticide detected in groundwater samples at the site. Other than the trace concentration of Dichloroprop detected during the most recent sampling event, 2,4-DB represents the only Herbicide detected in groundwater. Figure 41 is a Total Herbicides in Groundwater Isoconcentration Map. PCB, Pesticide and Herbicide concentrations in groundwater are summarized in Table 5B.

Figure 42 is Cross Section A-A' with VOC Concentrations in Groundwater, Figure 43 is Cross Section A-A' with SVOC, PCB, Pesticide and Herbicide Concentrations in Groundwater, Figure 44 is Cross Section B-B' with VOC Concentrations in Groundwater, and Figure 45 is Cross Section B-B' with SVOC, PCB, Pesticide and Herbicide Concentrations in Groundwater.

SECTION 8
SURFACE WATER INVESTIGATION

A total of five surface water samples were collected as part of the CSI. The surface water samples were collected as part of the expanded investigation on April 29, 2004. The samples were collected by filling the appropriate sample container with the required volume of water. The samples were collected from the following areas; the headwaters of the small streams that combine to form the stream that feeds the lake (E. Fork and W. Fork sample designations), where the small stream empties into the lake (designated as Outfall), the lake itself directly downgradient of the MW-6 area (designated as Lake #1) and the stream behind the dam at the Providence Road bridge (designated as Bridge). The locations of the surface water sampling locations are shown on Figure 1. A significant rainfall event occurred one day prior to the surface water sampling event.

The samples were submitted for laboratory analysis for VOCs by Method 8260, SVOCs by EPA Method 8270 and RCRA Metals by EPA Method 6010B/7471. Each of the samples indicated concentrations of VOCs and SVOCs that were BRL with the exception of a chloromethane concentration of 15 ug/L at the "Outfall" sampling location. There is no In-Stream Water Quality Standard for chloromethane. Each of the surface water samples indicated detectable concentrations of barium. However, the concentrations are believed to be representative of background concentrations. Surface water analytical results are summarized in Tables 2B, 3B and 4B. Laboratory analytical reports and chain of custody documentation for the surface water samples are included as Appendix VII.

Two additional surface water samples were collected from the surface water in the quarry on September 29, 2004. The samples were designated as Pit Surf-1 and Pit Surf-2. A small stream originates in the quarry and traverses to the northeast where it intersects with a second stream. After merging, the surface water feeds Lake Providence. Approximately 75% of the floor of the quarry contained standing water on the day of the sampling. The high rainfall amounts throughout the area in September had apparently resulted in an increase in the amount of water present in the quarry. Based on the potentiometric surface elevations obtained in nearby monitoring wells and the invert elevation of the quarry, it appears that groundwater does discharge into the bottom of the quarry. This is depicted on Cross Section A-A' included as Figure 5. The locations of the surface water samples are shown on the Site Map included as Figure 3.The sampled were collected and placed in laboratory supplied containers for analysis for VOCs by EPA Method 8260, SVOCs by EPA Method 8270 and RCRA Metals by EPA Method 6010B/7471. Results of the analysis indicate detectable concentrations of arsenic, barium, chromium, and lead. Surface water analytical results are summarized in Tables 2B, 3B and 4B. Laboratory analytical reports and chain of custody documentation have been included as Appendix VII.

SECTION 9
NONAQUEOUS PHASE LIQUIDS INVESTIGATION

Non aqueous phase liquids (NAPL) were not detected during the CSI. Numerous borings were advanced in the areas of highest concentrations detected in soil where NAPL would be expected to be encountered. No visual indications of NAPL were noted during the advancement of borings and/or monitoring wells.

The concentrations of toluene and xylenes in the groundwater samples collected at MW-6 are possibly indicative of light NAPL (LNAPL). However, LNAPL has not been detected at MW-6 or any other monitoring well locations at the site. The concentrations of chlorinated compounds at MW-6 are not indicative of dense NAPL (DNAPL) being present in this area.

SECTION 10
POTENTIAL RECEPTOR SURVEY & EXPOSURE PATHWAYS

The purpose of the potential receptor survey was to evaluate the potential for exposure to human populations to COI detected in soil and groundwater at the subject site. In order for exposure to occur, a complete exposure pathway has to be present. There are four key components to have a complete exposure pathway. The four key components can be described as follows:

1. a chemical source and release mechanisms
2. environmental media capable of transporting the COI released
3. the presence of a receptor at the point of exposure
4. the presence of a route of exposure at the exposure point

Without each of the previously outlined components, an exposure pathway is incomplete. A description of these key components as they exist at the site are described below.

10.1 Sources of COI and Release Mechanisms

The sources of COI at the subject site are the 55 gallon drums and other debris that were disposed of at the property at some point between the 1950's and approximately 1970. Numerous 55 gallon drums have been discovered at the site, most of which were at the surface or partially buried. Depressions where it appears drums have completely decomposed are also present at the site. Numerous smaller containers, many of which are paint containers and gasoline cans, have also been discovered at the site along with typical household type refuse. Numerous automotive parts have also been discovered. Due to the exposure of the containers to the environment, a precise description of the former contents is not possible. However, it is believed that many of the drums and containers contained paint. This is evidenced by the areas of discolored soil that are present at several locations. The areas are limited in extent, but appear to correspond to the highest concentrations of lead and barium detected in soil. It also appears based on the levels of VOCs detected that solvents and petroleum products were also released at the site.

It is not feasible to determine an actual time when potential releases occurred at the site. It is likely that the contents of many of the drums were spilled immediately at the time they were disposed of at the site. It is also likely that the contents of many of the drums were released over time as the drums were exposed to the environment and rusting occurred. Based on visual observations at the site, it is believed that burning of refuse may have occurred at the site. Numerous areas contain small amount of what appears to be melted plastics and other materials.

10.2 Environmental Transport Media

The COI detected in soil and groundwater at the site are varied in the nature of their respective physical and chemical characteristics. The characteristics of these various compounds greatly influence their behavior in the environment. The characteristics which affect the compounds ability to migrate in the environment include water solubility, water/carbon portioning coefficients (Koc) and vapor pressures. Compounds with higher water solubility rates are more

likely to become dissolved in groundwater. Higher Koc values result in compounds being likely to become bound to the organic fraction in the soil. This affect is compounded by soil which display higher clay content. Compounds with high vapor pressures are more likely to volatize when they come in contact with air. In general terms, the VOC compounds are more likely to become dissolved in groundwater. These compounds tend to naturally degrade faster in soils, but can persist in groundwater for an extended period of time. Many of the SVOC compounds tend to be less soluble, less mobile in groundwater, but can persist in soil longer than the VOCs. The metals are typically the least mobile of the compounds detected at the site. Groundwater, surface water runoff, and airborne transport as particulates can be considered environmental transport media at the site.

10.3 Potential Routes of Migration

10.3.1 Soil

The surface soil, and the soils just below the surface, at or immediately adjacent to the drums and other containers were most likely the first media to be impacted by releases at the site. Two primary routes of migration through the soil are the most likely scenarios at the site. One is the subsurface migration through preferential pathways in the soil such as root zones, layers of increased permeability, etc. by percolation of rainwater. The second is through dispersion of impacted surficial soils due to erosion. There is no artificial surfacing of any kind in the area of the site that has been impacted. It is likely that the majority of migration of impacted soil due to erosion occurred in the time frame immediately after the quarrying operation ceased. Significant vegetation growth has occurred at the site since that time. Based on the soil samples collected to date, it is believed that some migration utilizing both potential routes has occurred.

10.3.2 Surface Topography

Surface topography in the impacted area generally slopes to the north towards Providence Lake. The slope is relatively gentle in many areas, but steep, almost vertical, slopes are present at edge of the lake. The areas of the most heavily impacted soil are located directly upslope from the lake. It is likely that some of the impact detected at soil sampling locations near the lake are due to erosion of the upslope areas. Based on the sediment and surface water samples collected, it is believed that migration of contaminants into surface water is not a significant path of contaminant migration from the site.

10.3.3 Capillary Zone

The soil moisture content increases at the upper zone of the groundwater table as saturation is approached. The change in vertical conductivity can result in increased horizontal movement, often creating what is referred to as a "smear zone". It is possible that some migration along the capillary fringe, particularly in the area between MW-6 and MW-11, has occurred.

10.3.4 Groundwater

Groundwater has been impacted at the site. The migration of contaminants is controlled by the groundwater flow direction, the rate of groundwater flow, and in the case of the subject site also by the orientation and number of fractures in the bedrock.

10.4 Potential Receptors at Exposure Points

Exposure points include any areas where COI are accessible in soil, groundwater or other media to potential human and/or environmental (plant and animal species) receptors. Potential exposure points at the subject site include where workers or park visitors may come in contact with impacted soil, groundwater or surface water. Individual potential exposure points are summarized below.

10.4.1 Water Supply Wells

A water well survey was conducted by KEMRON as part of the initial assessment. Numerous private water supply wells were identified within a three mile radius of the site. A public water supply well is located on the premises of the park and is utilized to supply potable water to the park facilities. The location of this well is shown on Figure 2. KEMRON sampled this well on April 2, 2004. The well was sampled for VOCs by EPA Method 8260, SVOCs by EPA Method 8270, RCRA Metals by EPA Method 6010B/7471, PCBs by EPA Method 8082, Pesticides by EPA Method 8081A and Herbicides by EPA Method 8151A. The well was purged for by allowing the well to run through a hose for a period of approximately 30 minutes. The sample collected from the well reported concentrations of VOCs, SVOCs, PCBs, Pesticides, and Herbicides that were BRL with the exception of a chloroform concentration of 15 ug/L. The chloroform concentration is due to the chlorination process used to treat the well water. Laboratory analytical reports are included as Appendix VII.

Numerous private water supply wells are located in the immediate vicinity of the site. Each residence located along the entrance road to Providence Park utilizes a private water supply well. In addition, the section of Providence Road extending from immediately south of park entrance road to the north of the intersection Haygood Road has no municipal water supply available. In addition, the residences located across Lake Providence from the site also utilize private water supply wells. The private wells in closest proximity to the site are located due north of the impacted area across Lake Providence. Using the lake edge as the estimated plume boundary, these wells are located approximately 750 to 1,000 ft to the North. The private well located in closest proximity to the site that is not separated by a surface water body is owned by Mr. Charlie Lancelot. This well is located approximately 800 ft to the southwest (upgradient) of the impacted area. The well in closest proximity to the site, not separated by a surface water and not upgradient, is owned by Mr. Robert C. Pinkston. This well is located approximately 1,800 ft to the west (crossgradient) of the impacted area. The locations of known private wells in closest proximity to the site are shown on Figure 1. Based on the groundwater sampling conducted at the site, as well as the sampling of the onsite public supply well, exposure to impacted groundwater is unlikely.

In addition, Fulton County is currently has conducted sampling of nearby private drinking water wells. No impact to these wells from activities associated with the subject site were noted during the sampling.

10.4.2 Surface Water

Based on the groundwater sampling conducted at the site, the plume boundaries extend to the lake's edge in the area immediately downgradient of MW-4 and DW-2. The compounds detected in at these well locations are less than dense than water. Therefore, the likelihood of migration beneath the lake bottom is unlikely. In addition, bedrock is evident on the stream bed that forms the lake, and therefore, it is likely that the groundwater at MW-4 and DW-2 is discharging into the lake. This is further evidenced by the relative potentiometric surface elevations at MW-11 and DW-2. The surface water sample collected in this immediate area was BRL for VOCs. Each of the surface water samples indicated concentrations of VOCs and SVOCs that were BRL with the exception of a chloromethane concentration of 15 ug/L at the "Outfall" sampling location. This sample was collected where the small stream empties into the lake. There is no ISWQS for chloromethane. Based on the results of the surface water sampling, it is unlikely that exposure to humans via surface water ingestion has occurred.

10.4.3 Soil

Exposure to impacted soil at the would most likely be the result of visitors utilizing the walking trails at the site, or possibly workers during the limited excavation activities required to install the observation deck, benches and walking trails. Elevated concentrations of RCRA Metals and SVOCs were detected in limited areas of the walking trail area. The most significant concentrations were detected in wooded areas with substantial undergrowth away located in the center of the walking trails. Exposure due to particulates is also a potential pathway in dry conditions when dust may become airborne due to wind or heavy foot traffic.

10.4.4 Environmental Receptors

Environmental receptors include plant and animal species that may have the potential to be exposed to COI at the site. Given the undeveloped nature of the site, the potential exists for endangered and/or threatened species of plants and/or animals to inhabit the area. Based on information from the U.S. Fish and Wildlife database, endangered animal species that may inhabit Fulton County include; bald eagle, gray bat, red-cockaded woodpecker, Bachman's sparrow, Appalachian Bewick's wren, and Peregrine Falcon. Endangered or threatened plant species include the Little amphianthus, Black-spored quillwort, Michaux's sumac, Golden Seal, Bay Star-vine, Indian olive, and Piedmont barren strawberry. Endangered or threatened aquatic species in Fulton County include the Bluestripe Shiner and the Gulf Moccasinshell mussel. Given the wooded nature of the site and the residential use of the surrounding properties, there is significant habitat for bird species.

Given the marshy nature of the headwaters of the lake, this area can also be considered a potential environmental receptor. It is unknown if the area has been delineated for wetlands. AN

Ecological Risk Assessment has been conducted and will be discussed in greater detail subsequently in this report.

10.5 Exposure Routes

Potential exposure routes include accidental ingestion, inhalation and dermal contact with the COI detected in soil and groundwater. Based on the results of the investigation conducted to date, the most likely exposure route is dermal contact with impacted soil. Based on the results of the surface water sampling, the potential for accidental ingestion of COI through surface water is considered to be very low.

10.6 HSRA Evaluation

COI identified at a given site must be compared with RRSs as required by HSRA. The appropriate RRS is determined by property use, either residential or commercial. Site specific conditions can also be applied when determining a RRS. The most stringent RRS are the Type 1 for residential properties. Types 1 and 3 RRS include the values presented in the HSRA Rules (Appendix I and Table 1 of Appendix III) or the appropriate Risk Assessment Guidance for Superfund (RAGS) equations. Type 2 RRS were determined by calculating the appropriate RAGS equations with the default exposure assumptions published by the Georgia EPD. Specifics related to RRS will be presented subsequently in this report.

SECTION 11
STATISTICAL ANALYSIS – BACKGROUND CONCENTRATIONS

Metals are naturally occurring in the rock and soil. A statistical analysis was conducted in order to determine the background concentrations in the immediate vicinity of the site. Details pertaining to the statistical analysis are included as Appendix V. The calculated background concentrations are as follows; 1.87 mg/kg Arsenic, 174 mg/kg Barium, 0.94 mg/kg Cadmium, 9.23 mg/kg Chromium, 23.01 mg/kg Lead, 1.87 mg/kg Selenium, 0.935 mg/kg Silver, and 0.0435 mg/kg Mercury. The calculated background concentration for each metal are significantly less than the default values presented in Table 2 of Appendix III of the HSRA Rules. Therefore, the default values will be considered the background concentrations applicable to the site.

Barium was the only RCRA Metal detected in groundwater samples at the site, with the exception of barely detectable levels of chromium and selenium at single well locations. The highest barium concentration detected (0.192 mg/L) is an order of magnitude less than the MCL of 2.0 mg/L. Based on this, background concentrations of metals in groundwater are not applicable to the future remediation goals at the site. The trace concentrations of selenium and chromium are also an order of magnitude below the respective MCL.

VOCs, SVOCs, PCBs, Pesticides, and Herbicides are not naturally occurring, and therefore, the background concentrations for these constituents is the laboratory detection limit.

SECTION 12
RISK REDUCTION STANDARDS

Currently the Subject Property is used for non-commercial non-industrial activities; therefore, residential Risk Reduction Standards (RRS) criteria would apply to the Subject Property. We have assessed compliance with criteria for Type 1 and Type 2 RRS in this CSR.

Criteria for Type 1 and Type 2 standards are specified in sections 391-3-19-.07(6) and 391-3-19-.07(7) of the regulations. RRS were developed for each of the COI identified in soil and groundwater samples collected at the site by calculating the appropriate Risk Assessment Guidance for Superfund (RAGS) Equation. RAGS Equations 1 and 2 were used for assessment of groundwater and RAGS Equations 6 and 7 were used for the assessment of soil. RAGS Equation 8 was used in conjunction with RAGS Equations 6 and 7 for interim calculations of the volatilization factors. Lead was the only substance for which assessment was conducted using the specified criteria in Appendix IV of the HSRA rule. The IEUBK model was used for confirmation of the lead assessment results.

Compliance with Type 1 and Type 2 standards was assessed following the compliance assessment procedures as outlined in sections 391-3-19-.07(6) and 391-3-19-.07(7) of the regulations.

Generally, Type 1 standard is more stringent than Type 2 standard; therefore, compliance analysis with Type 2 for a given compound was not provided if the compound was already in compliance with Type 1 RRS.

40 CFR 261, Appendix II, Paragraph 2.2 (1993) indicates that in general the ratio between TCLP and concentration is 1:20. TCLP analysis was conducted on soil samples. The site specific average ratio between the TCLP and the total concentration was assesses to be 1:77 for metals and 1:19 for VOCs and SVOCs (refer to the TCLP assessment table). Accordingly, the corresponding TCLP was calculated for each pollutant of concern. The assessed TCLP was compared to Type 1 and Type 2 groundwater criteria to assess compliance.

A summary of compliance analysis with Type 1 and Type 2 and applicable remediation goals for soil is presented in Table 1 in Appendix IX. A summary of compliance analysis with Type 1 and Type 2 and applicable remediation goals for groundwater is presented in Table 2 in Appendix IX. RAGS formula, parameters, assumptions, calculations, and reference materials are enclosed in Appendix IX. Figure 45 displays the area with concentrations that exceed RRS for soil. Figure 46 displays the area with concentrations that exceed RRS for groundwater.

SECTION 13
CORRECTIVE ACTION COMPLETED TO DATE

Corrective action completed to date has consisted of two separate removal actions. The removal actions consisted of removing the drums and debris originally discovered at the site. The drums with contents were sampled on January 12, 2004 and submitted for laboratory analysis for PCBs, Full TCLP and RCRA Characteristics. The results of the analysis indicated the waste stream to be non-hazardous. The drums were placed into roll off containers and transported to Waste Management in Atlanta, Georgia for subsequent disposal. A total of 55 drums were disposed of during the initial source removal conducted on February 16 and 17, 2004. The majority of these drums were removed from the two main areas of drums initially discovered. One empty drum was removed from a location near the bench along the marshy area of the lake. Copies of the disposal manifests are included as Appendix X.

The second removal action consisted of the drums discovered in the thickly vegetated area during the EM survey. The drums with contents were sampled on April 29, 2004, and submitted for laboratory analysis for Full TCLP and RCRA Characteristics. The results of the analysis indicated the waste stream to be non-hazardous. The drums were placed into a roll off container and transported to Waste Management in Atlanta, Georgia for subsequent disposal. A total of 31 drums and numerous smaller containers were disposed of during the source removal action conducted on June 4, 2004. Copies of the disposal manifests are included as Appendix X.

SECTION 14
QUALITY ASSURANCE/QUALITY CONTROL

During the field work of the CSI, certain procedures were followed to:

- Insure that laboratory methods are within control limits;
- Verify the quality of data collected during field measurements; and
- Insure that cross contamination has not occurred during sample collection or sample transport.

14.1 Laboratory Quality Assurance/Quality Control

Internal quality control checks were conducted by AES, Inc. to monitor data integrity for each SDG. These checks included evaluating method blanks, matrix spikes, matrix duplicates, blank spikes, internal standards, surrogate standards, calibration standards, and reference standards. Laboratory data precision for organic analyses was monitored through the use of field duplicates. Duplicate groundwater samples were collected at MW-4 during the initial assessment conducted at the site. A duplicate groundwater sample labeled DMW-2 was collected from DW-1 during the expanded assessment. Laboratory accuracy was assessed with the use of matrix spikes, surrogate spikes and reference standards. Accuracy was measured in terms of percent recovery.

14.2 Field Operations Quality Assurance Quality Control Checks

Field performance was monitored by the Site Superintendent during the CSI investigation. Field instrumentation, including the PID and IP were calibrated each morning prior to use and generally each afternoon using supplied standards to insure the equipment was functioning properly and measurements were accurate. The Project Manager (PM) reviewed all field reports and drilling logs to determine if field documentation was appropriate and complete. The PM also reviewed the duplicate, rinse and trip blank data to identify any deficiencies in field sampling, handling or decontamination procedures.

Rinse blank samples were collected during hand auger, geoprobe and drilling activities to monitor the cleanliness of the sampling equipment and effectiveness of the cleaning procedures. Rinse blanks were collected with organic-free de-ionized water, and were analyzed for VOCs.

14.3 Soil Sampling Techniques

Soil samples were collected using hand auger, DPT and hollow stem auger technologies. Soil samples were placed into appropriate laboratory supplied containers. Samples were collected in either the hand auger, DPT sampling sleeve or a stainless steel split spoon sampler. The sample was observed for classification purposes. The sample was divided into three equal parts. VOC samples were collected by placing approximately five grams of the sample into two laboratory supplied pre-weighed 40 mL vials preserved with sodium bisulfate and one 40 mL vial with methanol. A 4 oz jar of the sample was also submitted for dry weight analysis. A second portion of the sample was placed into a resealable plastic bag and allowed to reach ambient temperature prior to field screening with a PID. A third portion was also placed in a resealable bag and placed on ice for possible shipment to the laboratory for SVOC, PCB, Herbicide and Pesticide analysis.

The shallowest interval collected from a boring location was submitted for RCRA Metals analysis. Sampling equipment was decontaminated between each sampling interval and/or boring location as appropriate with an alconox solution followed by a deionized water or steam cleaner wash. Decon water was collected and stored for subsequent disposal. The samples collected were placed on ice and the chain of custody completed. Samples were couriered to AES, Inc. in Atlanta, Georgia for analysis. Field equipment blanks indicated concentrations that were BRL for constituents analyzed.

SECTION 15
ECOLOGICAL RISK ASSESSMENT

An Ecological Risk Assessment (ERA) has been conducted at the subject site. The ERA was conducted to provide an evaluation of potential risks to ecological receptors as defined previously in this report. A copy of the ERA has been included as Appendix XI.

EPD COMMENTS ON THE CSR REPORT

Georgia Department of Natural Resources
2 Martin Luther King, Jr. Drive, S.E., Suite 1462 East, Atlanta, Georgia 30334-9000
Noel Holcomb, Commissioner
Environmental Protection Division
Carol A. Couch, Ph.D., Director
404/657-8600

- The background concentrations for soil are as follows:

Barium	174 mg/kg	SVOCs	Detection Limit
Chromium	9.23 mg/kg	PCB	Detection Limit
Lead	23.01 mg/kg	Pesticides	Detection Limit
VOCs	Detection Limit	Herbicides	Detection Limit

- The concentrations of metals detected October 5, 2004 in MW-9 as presented in the analytical package are the background concentrations for groundwater (there is a typographical error for barium in MW-9). Since all metals concentrations were non-detect, the detection limit will be the background concentrations for metals, VOCs, SVOCs, pesticides, and herbicides in groundwater.

- The approved risk reduction standards of Section 391-3-19-.07 of the Rules for Hazardous Site Response (Rules) are as follows:

	Soil (mg/kg)		Groundwater (mg/L)	
	Type 1	Type 2	Type 1	Type 2
Volatile Organic Compounds				
Acetone	400	9.95	4.0	14
Benzene	0.55	0.0084	0.005	0.007
2-Butanone	200	1.69	2	2.3
Carbon disulfide	DL	5.68	4.0	0.329
Cis-1,2-DCE	0.530	0.018	(0.005) DL	0.018
Cyclohexane	20	77.15	(0.005) DL	3.14
Ethylbenzene	70	1.97	0.700	0.44
Isopropylbenzene	22	1.32	(0.005) DL	0.20
4-Methyl-2-Pentanone	200	1.57	2.0	0.05
Styrene	14	3.40	0.1	0.507
Tetrachloroethene	0.500	0.012	0.005	0.003
Trichloroethene	0.500	0.0088	0.005	0.0005
1,1,1-TCA	20	1.79	0.200	1.0
Toluene	100	1.93	1.0	0.214
Vinyl chloride	0.20	0.0024	0.002	0.001
Xylene	1000	30.37	10.0	0.059
Semi-Volatile Organic Compounds				
Acetophenone	400	4.13	4.0	0.0000119
Bis(2-ethylhexyl)phthalate	50	80.55	(0.005) DL	0.13
Butyl benzyl phthalate	50	93.26	0.100	0.37
Dimethyl phthalate	40,000	151.88	400	156
Di-n-butyl phthalate	400	47.16	4.0	0.18
Di-n-octyl phthalate	70	3,129*	0.7	0.0704
2,4-dimethylphenol	70	1.53	0.7	0.04

	Soil (mg/kg)		Groundwater (mg/L)	
	Type 1	Type 2	Type 1	Type 2
Fluoranthene	500	551.74	1	0.626
2-Methylphenol	3.8	0.12	DL (0.01)	0.09
4-Methylphenol	3.8	0.038	DL (0.01)	0.009
Naphthalene	100	0.24	0.020	0.0017
Phenanthrene	110	69.20	0.05	0.469
Pyrene	500	611.40	1.0	0.055
Hexachloroethane	10	0.20	0.001	0.015
Metals				
Arsenic	20	5.65	0.05	0.00002
Barium	1,000	35.30**	2.0	0.0003
Cadmium	2.0	1.33	0.005	0.00004
Chromium	100	6.82	0.1	0.000006
Lead	75	47.67	0.015	0.015
Selenium	2.0	0.92	0.05	0.078
Mercury	0.50	0.031**	0.002	0.0047
PCBs, Pesticides, Herbicides				
4,4-DDE	0.66	27*	0.0001	0.005
4,4-DDD	0.66	29.54	0.0001	0.008
4,4-DDT	0.66	0.95**	0.0001	0.00063
Beta-BHC	0.66	0.0015	0.00005	0.00012
Alpha-chlordane	9.2	11.17	0.002	0.0004
Beta-chlordane	9.2	11.17	0.002	0.0004
Heptachlor	0.66	2.0	0.0004	0.000047
Arochlor 1242	1.60	0.16	0.0005	0.00011
Arochlor 1248	1.60	0.16	0.0005	0.00011
Arochlor 1260	1.60	0.73	0.0005	0.00011
2,4,5 TP	10	0.20	0.07	0.156
Pentachlorophenol	3.30	0.37	0.001	0.015

* Denotes soil Type 2 value is based on RAGS Equation.
** Denotes soil Type 2 value is based on Ecological Risk Assessment calculations.
All other soil Type 2 values are based on the calculated Soil Screening Level (SSL).

- Fulton County has not completely delineated soil or groundwater horizontally and vertically to background concentrations as specified in 391-3-19-.06(3)(b) of the Rules. Please see additional information under Corrective Actions.

- Please note that the following chemicals are not regulated substances under the Rules and do not need to be delineated or demonstrate compliance with the risk reduction standards:

- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene
- n-Propylbenzene
- n-Butylbenzene
- Isopropyltoluene
- Capralactam
- 2-Methylnapthalene
- Methylcyclohexane
- Benzyl alcohol
- 2,4-Dichlorophenoxy butyric acid
- 2,4-Dichlorophenoxy propionic acid

- The statement on page 16 regarding soil delineation is incorrect. Complete delineation of butyl benzyl phthalate, barium, and BTEX in soil will not result in delineation of other compounds.

- Third paragraph on page 16 refers to Total Chloroethanes and the figures refer to Total Chlorinated Ethenes. The narrative on page 16 should refer to Total Chlorinated Ethenes.

- The second paragraph of page 17 stated Acetone was the only VOC detected in soil. EPD disagrees with this statement, as Acetone was not the only VOC detected in soil, BTEX was also detected.

- Fulton County concluded in the third paragraph of page 17 that "metals concentrations exceeding background appear to confined to the upper 2-5' of the soil profile." This statement is misleading as metals samples were not collected greater than 5 feet.

- Section 6.1.1 "Conclusions" states it is unlikely that Acetone and Isopropylbenzene are actually present in sediment due to their volatile nature. EPD disagrees with this statement as both Acetone and Isopropylbenzene were detected in sediment samples.
- Fulton County inferred the metals contamination detected in groundwater are due to turbidity. However, groundwater turbidity levels were less than 10 NTU.

- There are numerous typographical errors on Table 2A, 5A, 2B, 3B and 4B. Please refer to laboratory analytical reports for correct concentrations.

- The following data is missing from the tables:

  - GP-17 data from 5/6/04 is missing from all soil tables.
  - MW-15(surf) soil data missing from Table 2A and Table 3A.
  - GP-8 data is missing from Table 4A.
  - Metals analytical data for soil sample MW-15 (14-16) is missing from Appendix VI.
  - Concentrations of pentachlorophenol are not included on numerous lab sheets.
  - MW-14, MW-15, MW-16, and MW-17 groundwater data for VOCs collected 5/17/04 are missing from Table 2B.
  - Sample locations for last set of groundwater analytical in Appendix VI are not provided.

- Fulton County has identified the following property as part of the site:

Property owner:	Fulton County Parks and Recreation
Location:	Providence Park 13440 Providence Park Drive Alpharetta, Fulton County, GA 30004-1272 Tax Parcel ID No. 22-4780-0963-001
Contact Person:	John Culbreth, Director
Telephone Number:	404-730-6200

- Fulton County has not identified any additional responsible parties in accordance with Section 391-3-19-.06(3)(b)(6) of the Rules.

Corrective Actions

Based on the meeting held February 4, 2005, EPD is approving excavation and off-site disposal of contaminated soil subject to the conditions listed below:

Soil:

1. Fulton County will excavate contaminated soil exceeding the approved Type 1/2 risk reduction standards. Following excavation, confirmation grab samples will be collected from the base and side walls of each excavated area to verify that the risk reduction standards have been met. The confirmation samples will be analyzed for RCRA Metals, VOCs, SVOCs, PCBs, Pesticides, and Herbicides.

2. Fulton County has not completely delineated soil horizontally and vertically to background concentrations as specified in 391-3-19-.06(3)(b)(2) of the Rules. After excavation is complete, Fulton County will complete soil delineation in the following areas:

VOCs
- ◊ East of MW-16
- ◊ East of MW-15
- ◊ East of GP-22 (GP-28)
- ◊ Vertically at DW-2
- ◊ South of MW-5 (GP-8)
- ◊ West of MW-17

SVOCs
- ◊ East of MW-16
- ◊ East of MW-15
- ◊ East of GP-22 (GP-28)
- ◊ Southeast of GP-30
- ◊ Northeast of HA-7
- ◊ Vertically at DW-2
- ◊ West of MW-17
- ◊ West of MW-18
- ◊ South of MW-5 (GP-8)

RCRA Metals
- ◊ South of MW-5 (GP-8)
- ◊ East of GP-22 (GP-28)
- ◊ East of MW-15
- ◊ South of GP-27

PCB, Pesticides, Herbicides
- ◊ The site has not been delineated in any direction for any of these regulated constituents.

3. In accordance with the Section 391-3-19-.06(3)(b)(2)(iv) of the Rules, please provide a description of sampling techniques including sampling and analysis techniques, sample handling and preservation, equipment decontamination, chain-of-custody, laboratory analytical methods and the rationale for selection, and laboratory QA/QC. These procedures must be consistent with the methodologies prescribed in EPA's November 2001 edition of the document entitled: *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM).* Please include a discussion regarding soil homogenizing procedures. For future sampling, please note it is not appropriate to store samples in plastic bags in cooler; soil should be placed in jar directly.

Groundwater:

4. Fulton County has not completely delineated groundwater horizontally and vertically to background concentrations as specified in 391-3-19-.06(3)(b)(3) of the Rules. Prior to and after excavation, Fulton County will collect groundwater samples from all monitoring wells and analyze them for RCRA Metals, VOCs, SVOCs, PCBs, Pesticides, and Herbicides. Depth to groundwater and gauging of the surface water must be obtained during these events to create an up-to-date potentiometric surface map.

5. In the event that Fulton County is unable to demonstrate delineation to background concentrations, additional groundwater monitoring wells may be required to delineate the site.

6. All wells that are removed during excavation must be replaced. In addition, three additional wells must be installed: a deeper well adjacent to DW-2 and two (2) shallow wells equidistant between MW-9 and MW-10. All shallow wells must be screened above the water table. For deep wells, outercasing should go into bedrock, unless there is no groundwater in soil above rock. Generalized well construction diagrams must be provided for each new well.

7. Groundwater gradient calculations should be done using potentiometric surface map rather than between wells. In accordance with the Section 391-3-19-.06(3)(b)(3)(iii) of the Rules, please show calculations for hydraulic gradient and groundwater velocity, and show on a potentiometric surface map the location of measurements for these calculations.

8. In accordance with the Section 391-3-19-.06(3)(b)(3)(vi) of the Rules, please provide a description of methods used to determine hydraulic conductivities and other pertinent hydrogeological characteristics, including a description of any slug and/or aquifer tests.

9. In accordance with the Section 391-3-19-.06(3)(b)(3)(vi) of the Rules, please provide a description of sampling techniques including sampling and analysis techniques, sample handling and preservation, equipment decontamination, chain-of-custody, laboratory analytical methods and the rationale for selection, and laboratory QA/QC. These procedures must be consistent with the methodologies prescribed in EPA's November 2001 edition of the document entitled: *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM).* Please note that EISOPQAM discourages the use of groundwater sampling with bailers. For future sampling events, please use an EPA approved low-flow pump for groundwater sampling.

10. Fulton County will submit a Groundwater Corrective Action Plan within 120 days after completion of the soil/source removal specified in Condition 1.

Tables and Figures:

11. In the analytical tables, the laboratory-reporting limit (RL) is reported as the detection limit for metals in soil and VOCs, SVOCs, PCB, pesticides, herbicides, and metals in groundwater; and the laboratory method detection limit (MDL) is reported as the detection limit for VOCs, SVOCs, PCB, pesticides and herbicides in soils. Please revise all tables to include the "Reporting Limit" as the detection limit.

12. Different source areas are identified in Figure 2, Section 4.1 and Figure 3, and Section 4.1.2 and Figure 9. Provide a figure that identifies and labels the entire source area(s). Please depict on the figure the areas where drums were found and removed.

13. Please include park boundaries on Figure 2 Area Map.

Reporting

Submit a Soil Excavation Report within 120 days after completion of the soil/source removal specified in Condition 1. The report must address the above Conditions 1-13 and include the following items:

a. Tables of all soil and groundwater sampling data. The tables should include the date the sample was collected, the depth at which the sample was collected, the method detection limit for the specific constituent, the site-specific background concentration for the constituent, the applicable risk reduction standard, and the resulting concentration. Please denote those sampling points excavated for ease of review.

b. Analytical results including appropriate QA/QC data;

c. Pursuant to the Rules for Commercial Environmental Laboratories, a stipulation that the laboratory is approved including the name of accrediting agency, scope of accreditation relevant to the data submitted, accreditation number, effective (or issuing) date of accreditation, and expiration date of accreditation;

d. A narrative and tabular summary of all pertinent field data including groundwater elevation data, water quality measurements, and PID readings from test pits;

e. A figure that includes a table at each soil sample location with the soil identification number, the dates each location was sampled, the concentration (and units) of each regulated substance detected in soil (including all historical samples). Please denote those sampling points excavated for ease of review;

f. Five figures that includes a table at each soil sample location with the soil identification number, the dates each location was sampled, the concentration (and units) of each regulated substance detected in soil (including all historical samples); (1) Metals, (2) Pesticides/PCBs/Herbicides, (3) SVOCs, (4) Chlorinated VOCs, and (5) All other VOCs;

g. Four (4) figures that includes a table at each groundwater sample location with the groundwater monitoring well identification number, the dates each location was sampled, the concentration (and units) of each regulated substance detected in groundwater (including all historical samples); (1) Metals, (2) Pesticides/PCBs/Herbicides, (3) SVOCs, and (4) VOCs;

h. A map showing all sampling points by sample number, and vertical cross-sections of appropriate scale depicting concentrations for all contaminants superimposed upon site stratigraphic features and monitoring wells. Boring logs recording soil descriptions should support cross-

sections. In addition to the cross-sections selected in the CSR, provide two (2) additional cross-sections and list all detected constituents in soil and groundwater:

1) MW-18 –> MW-3 –> MW-4 –> DW-2/MW-11 –> MW-10
2) MW-9 –> MW-6/DW-1 –> MW-11/DW-2 –> LAKE;

i. When presenting the analytical results in tables and maps, please do not use the notation of "ND" (not detected) or "0" (below laboratory detection limit). The analytical results should specify the concentration detected or as less than the detection limit (for example, < 0.003 mg/l);

j. A legal description of the site in accordance with Section 391- 3-19-.06(3)(b)(5) of the Rules;

If you have any questions, please contact Ms. Regina Campbell at (404) 657-8600.

Sincerely,

Tim Cash
Program Manager
Hazardous Sites Response Program

c: Ms. Kimberly Brown
Fulton County Department of Environment and Community Development

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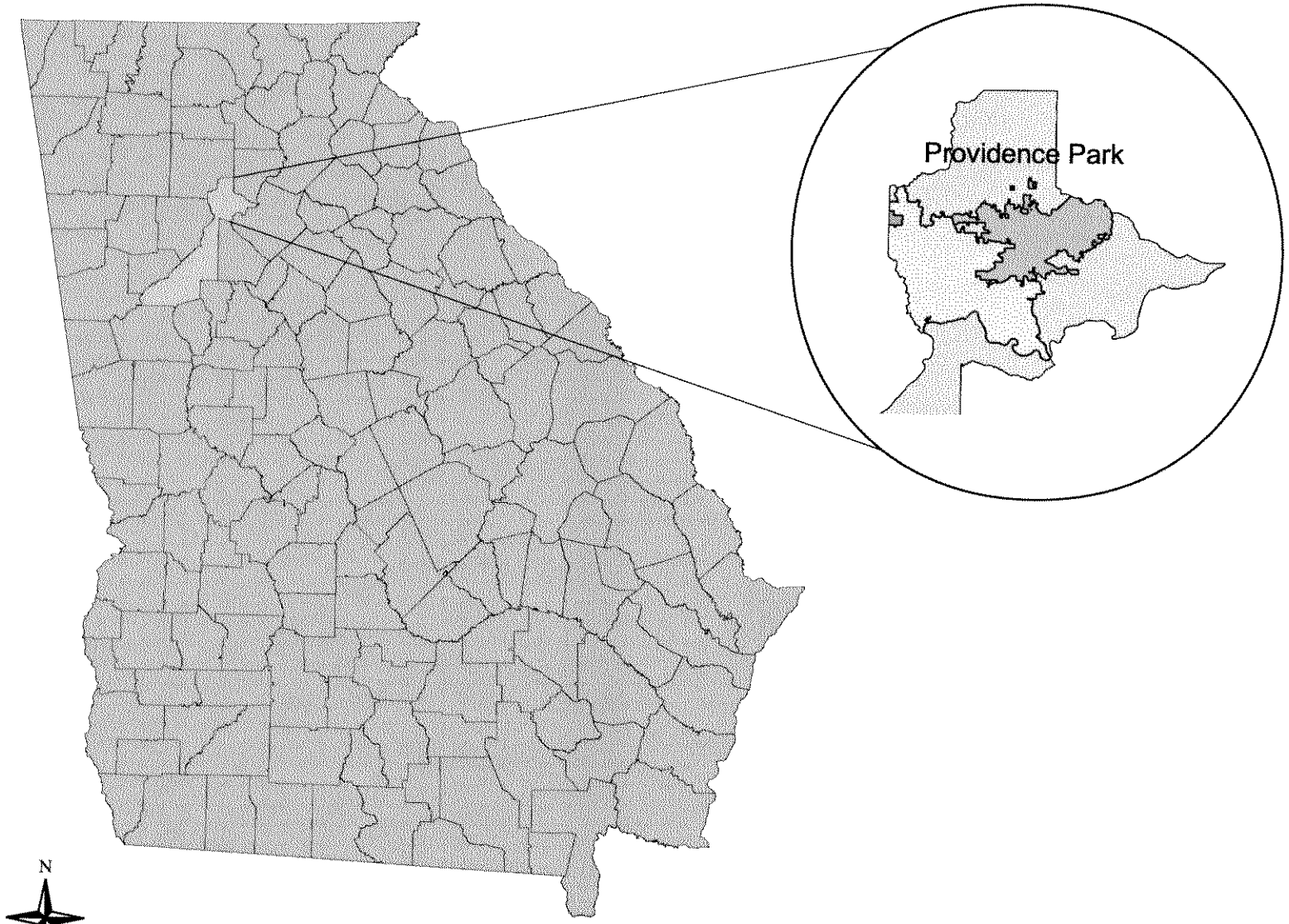
MAPS



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of Environment and Community Development
Information Services Division
Geographic Information System

Figure 1	**Site Location and Vicinity Map** **Providence Park** **Remediation Project** **Phase I**

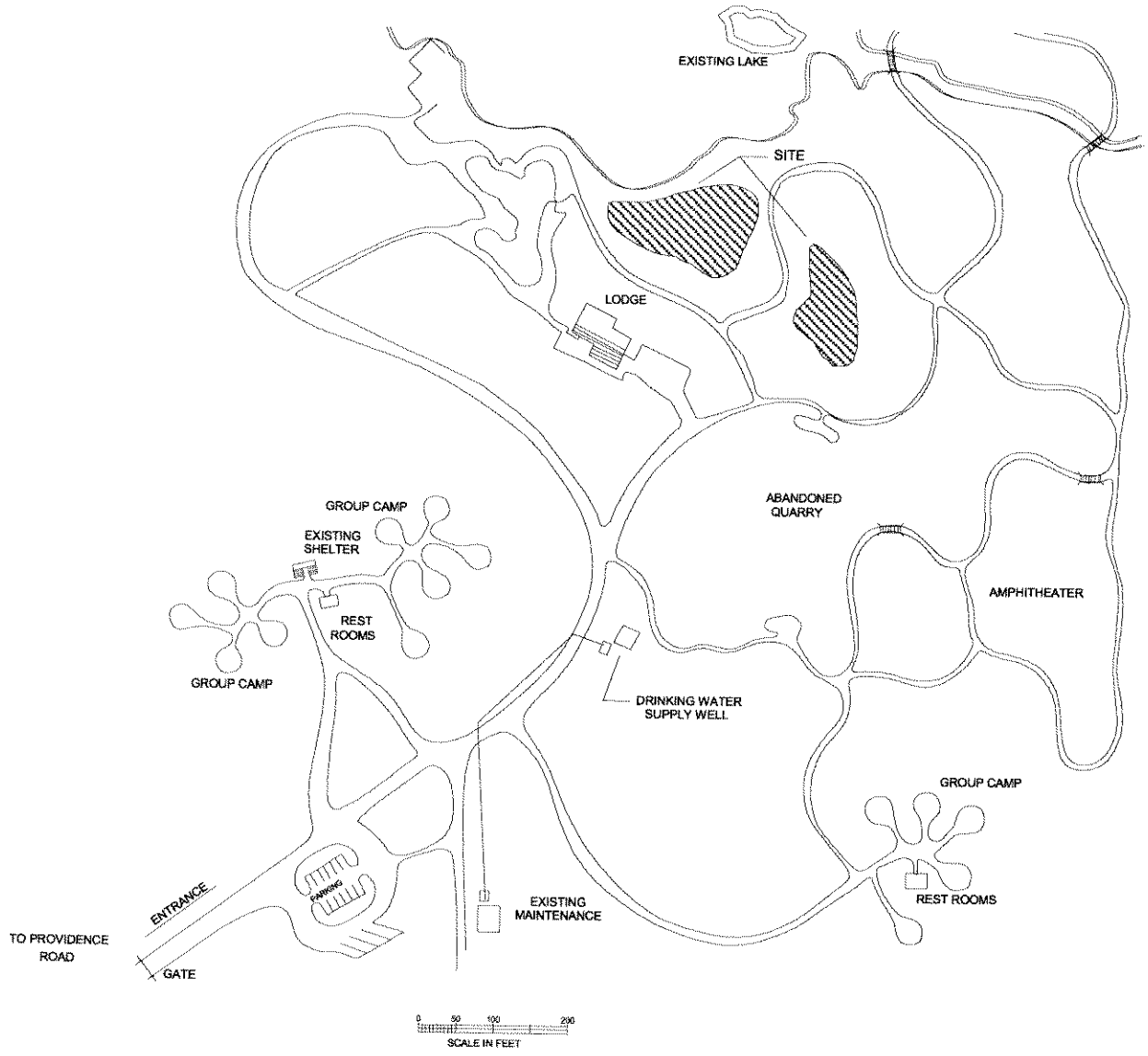

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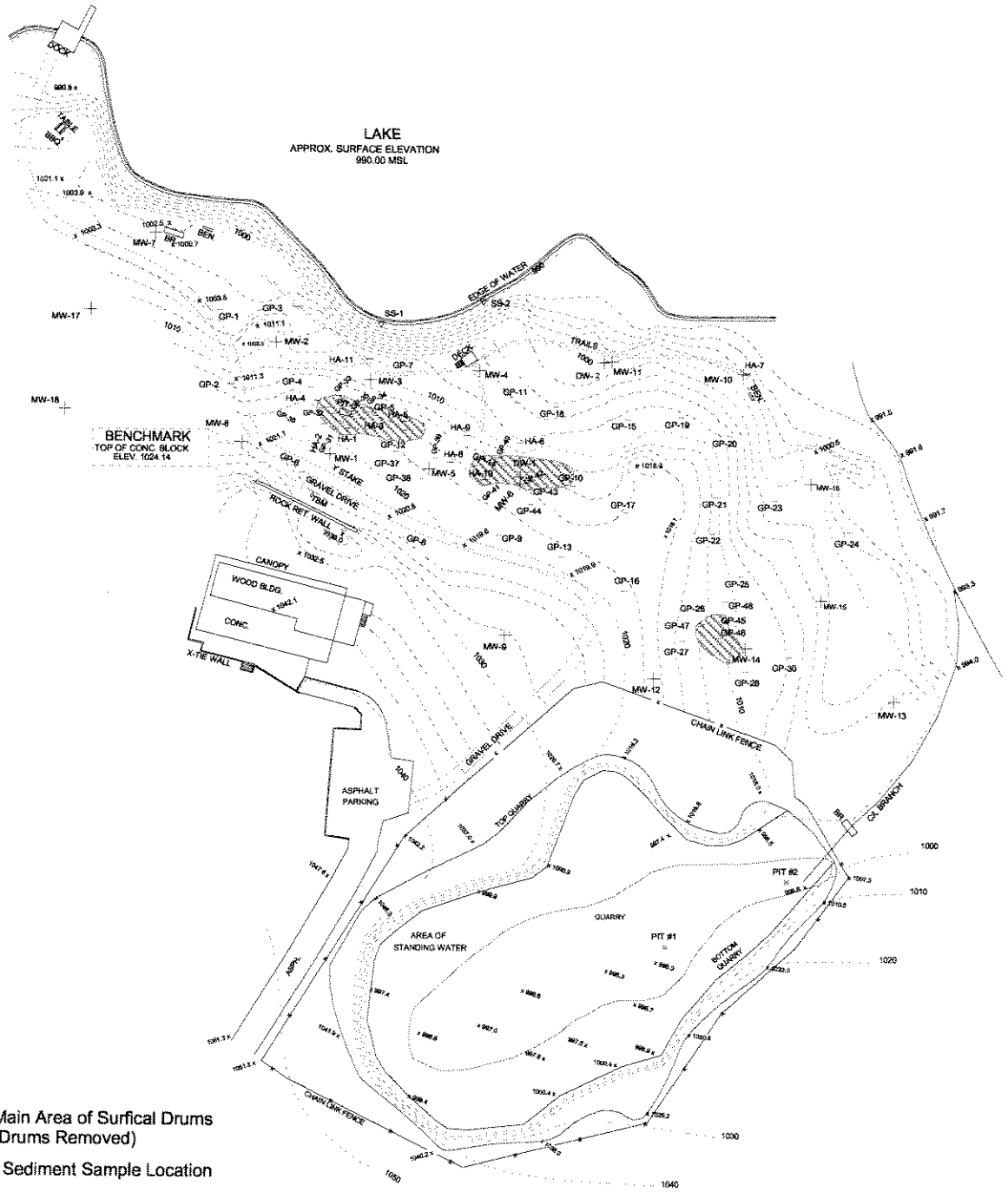
Figure 2

Project Site Map
Providence Park
Remediation Project
Phase I



Main Area of Surfical Drums (Drums Removed)

SS = Sediment Sample Location

GP = Geoprobe Location

MW = Monitoring Well Location

HA = Hand Auger Location

PIT1/2 = Surface Water Sample Location

DW = Delineation Well Location (Type III)

N

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Figure 3

Sample Location Map Providence Park Remediation Project Phase I

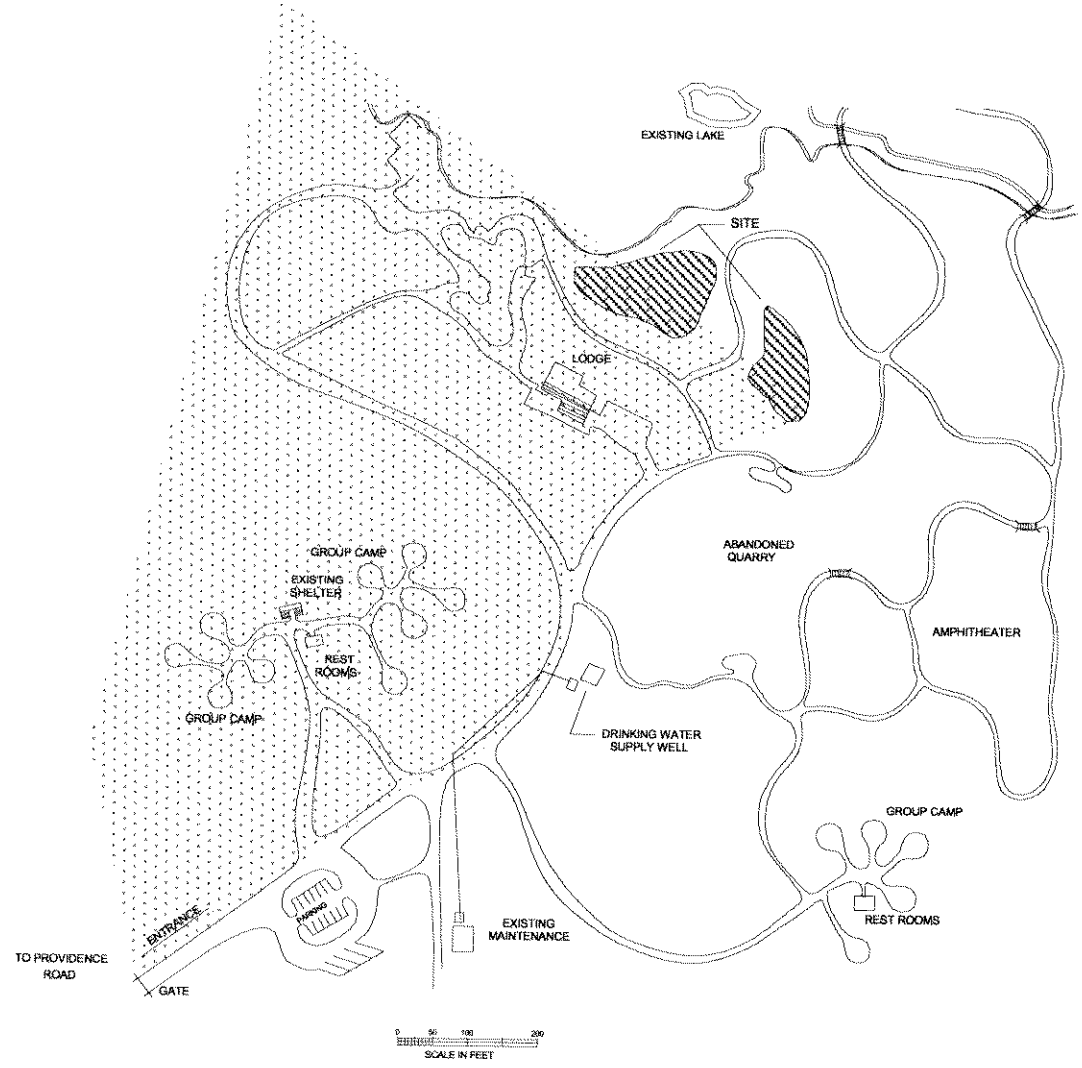

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Figure 4

Dead Tree Removal Area Providence Park Remediation Project Phase I